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MATHEMATICS · EAPCET (EAMCET)

Differentiation

Previous Year Questions with answers

443 questions · **146** papers · **2010–2026** · newest paper first

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What is in this PDF: every Differentiation question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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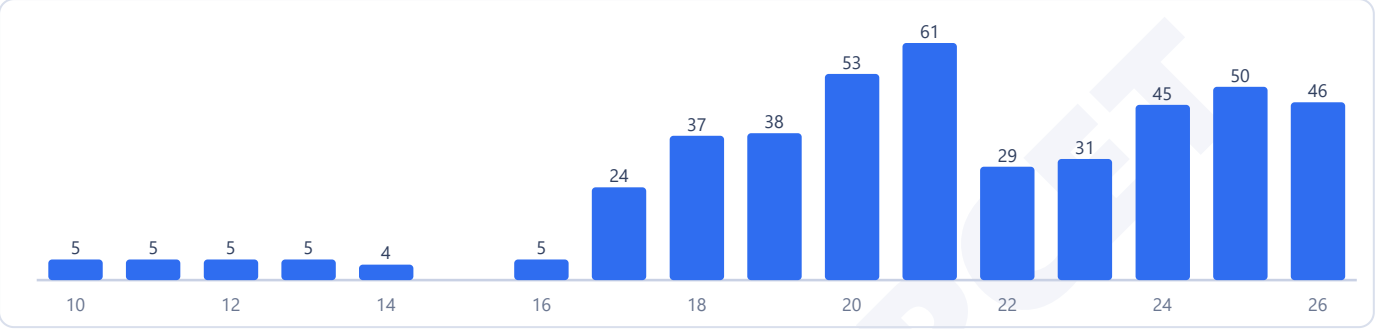
Chapter at a glance

3.3%	443	74 of 77	443 / 0
of Mathematics questions, 2022–2026	questions, 2010–2026	papers asked it, 2022–2026	MCQ / numerical, 2010–2026

Trend. Rising: 3.1 questions per paper in 2024–2026 against 1.9 in 2022–2023.

Questions per year



Counts are the questions we hold: 443 in 146 papers. 2 questions in this chapter came back in more than one paper.

Most-asked topics in this chapter (2010–2026)

Methods of Differentiation	269
Higher Order Derivatives	102
Mean Value Theorems	72

How often it comes up

Differentiation represents a core operational mechanism of differential calculus that consistently produces multiple examination items per sitting. Over the complete testing record from 2010 through 2026, Differentiation supplied 443 questions across 149 evaluated exam papers, featuring in 146 sittings to record an average of 3.0 questions per paper and a 3.7 percent subject share. In modern examination sessions from 2022 to 2026, examiners set 201 questions across 77 sittings, with questions appearing in 74 papers to yield 2.6 questions per paper and a 3.3 percent subject share. This establishes the chapter at rank 17 of 29 mathematics chapters.

The chapter has been included across every exam year, missing only three papers out of 77 between 2022 and 2026. Looking at the three most recent calendar cycles from 2024 to 2026, students encountered 141 questions across 46 papers (present in 45 sittings, averaging 3.1 questions per test and a 3.8 percent share). In the previous examination span from 2010 to 2021, the chapter provided 242 questions across 72 sittings (present in all 72 papers, averaging 3.4 per test and a 4.2 percent share). Evaluating temporal movement, comparing early testing with the last three years shows the share is about the same, while comparing recent testing with the last three years shows the share is up. Across the two regional boards between 2022 and 2026, Andhra Pradesh administered 108 questions across 48 papers (45 papers with questions, 2.3 per test, 2.8 percent share), while Telangana administered 93 questions across 29 papers (all 29 papers, 3.2 per test, 4.0 percent share).

Most-asked topics

Questions in this chapter organize into three core differential calculus themes:

- **Methods of Differentiation**: Generating 269 total questions, with 131 appearing in recent testing (tested through 2026). Key concepts encompass chain rule for composite functions, implicit differentiation, logarithmic differentiation of variable-power towers, inverse trigonometric substitution, and parametric differentiation.

- **Higher Order Derivatives**: Supplying 102 total questions, with 39 set in modern examinations (last asked in 2026). Coverage includes second and third derivatives of parametric curves, eliminating arbitrary parameters to establish differential identities, and evaluating higher derivatives at specific points.
- **Mean Value Theorems**: Delivering 72 total questions, with 31 emerging in recent years (tested up to 2026). Focus areas involve Rolle theorem conditions, Lagrange mean value theorem intermediate points, and Cauchy mean value theorem ratio evaluations.

What the questions look like

Examiners test rapid trigonometric substitutions, implicit derivatives, and parametric chain rules.

A frequent problem type presents a complicated inverse trigonometric expression whose internal argument can be simplified into a simple multiple of theta by substituting x equals tan theta or sin theta; candidates differentiate the resulting linear form in a single step. Another staple question asks for the second derivative of a parametric curve where x and y are given in terms of parameter t. Candidates must remember that finding the second derivative requires dividing the derivative of dy over dx with respect to t by dx over dt. Questions on mean value theorems typically provide a specific continuous function on an interval and ask for the exact numerical value of c satisfying the mean value derivative condition.

How to practise it

Master standard inverse trigonometric substitutions to bypass messy product rules. For two x divided by one plus x squared, substitute x equals tan theta to reduce the expression to sin two theta. For one minus x squared divided by one plus x squared, use x equals tan theta to reduce to cos two theta.

When evaluating second derivatives of parametric functions x equals f of t and y equals g of t, first find dy over dx as g prime of t divided by f prime of t. Then, differentiate dy over dx with respect to t, and multiply by dt over dx (which is one divided by f prime of t). For Rolle theorem, verify all three conditions: continuity on closed interval [a, b], differentiability on open interval (a, b), and equality of endpoints f of a equals f of b. For Lagrange theorem, solve f prime of c equals the quotient f of b minus f of a divided by b minus a.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

f is differentiable function such that $f(1)=8$ and $f'(1)=\frac{1}{8}$. If f is invertible and $g=f^{-1}$, then

(A) $g'(1)=8$
(B) $g'(1)=\frac{1}{8}$
(C) $g'(8)=8$
(D) $g'(8)=\frac{1}{8}$

Answer: (C) $g'(8)=8$ · The council's preliminary key

Q2 AP EAPCET 2026 · 18 May · Shift 1 MCQ

If $f(x)=\text{Cot}^{-1}\left(\sqrt{\cos 2x}\right)$, then $f'\left(\frac{\pi}{6}\right)=$

(A) $\frac{1}{\sqrt{3}}$
(B) $\frac{2}{\sqrt{3}}$
(C) $\sqrt{\frac{2}{3}}$
(D) $\frac{-2}{\sqrt{3}}$

Answer: (C) $\sqrt{\frac{2}{3}}$ · The council's preliminary key

Q3 AP EAPCET 2026 · 18 May · Shift 1 MCQ

If $\sqrt{x}+\sqrt{y}=\sqrt{a}$, then $\left(\frac{d^2y}{dx^2}\right)_{x=a}=$

(A) $\frac{1}{a}$
(B) $\frac{1}{2a}$
(C) $\frac{1}{2\sqrt{a}}$
(D) $\frac{1}{2}$

Answer: (B) $\frac{1}{2a}$ · The council's preliminary key

Q4 AP EAPCET 2026 · 18 May · Shift 1 MCQ

If the function $f(x)=x^3+bx^2+ax$ satisfies the conditions of Rolles theorem in $[1,3]$ with $c=2+\frac{1}{\sqrt{3}}$ then $(a,b)=$

(A) $(11,6)$
(B) $(11,-6)$
(C) $(6,11)$
(D) $(6,-11)$

Answer: (B) $(11,-6)$ · The council's preliminary key

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Q5 AP EAPCET 2026 · 18 May · Shift 2 MCQ

If $x^2y - xy^2 + x^3 - y^3 = 0$, then $\frac{dy}{dx}$ at the point $(1, 1)$ is

(A) 1

(B) 0

(C) -1

(D) Does not exist

Answer: (A) 1 · The council's preliminary key

Q6 AP EAPCET 2026 · 15 May · Shift 1 MCQ

If $f(x) = \sqrt{-(1+x)}\,\mathrm{Sec}^{-1}x$ is a real valued function, then $f'(x) =$

(A) $-\frac{\mathrm{Sec}^{-1}x}{2\sqrt{-(1+x)}} + \frac{1}{x\sqrt{x-1}}$

(B) $-\frac{\mathrm{Sec}^{-1}x}{2\sqrt{-(1+x)}} - \frac{1}{x\sqrt{1-x}}$

(C) $-\frac{\mathrm{Sec}^{-1}x}{2\sqrt{-(1+x)}} - \frac{1}{x\sqrt{x-1}}$

(D) $-\frac{\mathrm{Sec}^{-1}x}{2\sqrt{-(1+x)}} + \frac{1}{x\sqrt{1-x}}$

Answer: (B) $-\frac{\mathrm{Sec}^{-1}x}{2\sqrt{-(1+x)}} - \frac{1}{x\sqrt{1-x}}$ · The council's preliminary key

Q7 AP EAPCET 2026 · 15 May · Shift 1 MCQ

If $x \in [-1, 1]$ and $y = (\mathrm{Cot}^{-1}x)^{\mathrm{Cos}^{-1}x}$, then $\left(\frac{dy}{dx}\right)_{x=0} =$

(A) $\left(\frac{\pi}{2}\right)^{\frac{\pi}{2}}\left(1 + \log\frac{\pi}{2}\right)$

(B) $\left(\frac{\pi}{2}\right)^{\frac{\pi}{2}}\left(1 - \log\frac{\pi}{2}\right)$

(C) $-\left(\frac{\pi}{2}\right)^{\frac{\pi}{2}}\left(1 + \log\frac{\pi}{2}\right)$

(D) $\left(\frac{\pi}{2}\right)^{\frac{\pi}{2}}\left(\log\frac{\pi}{2} - 1\right)$

Answer: (C) $-\left(\frac{\pi}{2}\right)^{\frac{\pi}{2}}\left(1 + \log\frac{\pi}{2}\right)$ · The council's preliminary key

Q8 AP EAPCET 2026 · 15 May · Shift 1 MCQ

If $x = \mathrm{Sinh}^{-1}t + \log(t^2+1)$ and $y = \mathrm{Tan}^{-1}t + \log|t|$, then $\frac{dy}{dx} =$

(A) $\frac{t^2+t+1}{2t+\sqrt{t^4+t^2}}$

(B) $\frac{t^2+t+1}{2t+\sqrt{t^2+1}}$

(C) $\frac{t^2+t+1}{2t^2+\sqrt{t^4+t^2}}$

(D) $\frac{t^2+t+1}{2+\sqrt{1+t^2}}$

Answer: (C) $\frac{t^2+t+1}{2t^2+\sqrt{t^4+t^2}}$ · The council's preliminary key

Q9 AP EAPCET 2026 · 15 May · Shift 2 MCQ

If $f(x)=\mathrm{Tan}^{-1}x$ and g is the inverse of 'f', then $g'(f(2))=$

(A) 1

(B) 2

(C) 4

(D) 5

Answer: (D) 5 · The council's preliminary key

Q10 AP EAPCET 2026 · 15 May · Shift 2 MCQ

If $f(x)=\mathrm{Tan}^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$, then $f'\left(-\frac{1}{2}\right)=$

(A) $-\frac{1}{\sqrt{2}}$

(B) $\frac{1}{\sqrt{2}}$

(C) $-\frac{2}{\sqrt{15}}$

(D) $\frac{2}{\sqrt{15}}$

Answer: (D) $\frac{2}{\sqrt{15}}$ · The council's preliminary key

Q11 AP EAPCET 2026 · 14 May · Shift 1 MCQ

If $f(x)=\sqrt{2^{2x}\log(3x-2)}$, then $f'(2)=$

(A) $\frac{4\log 2\log 4+3}{\sqrt{\log 4}}$
(B) $\frac{8(\log 2)^2+3}{2\sqrt{\log 4}}$
(C) $\frac{8(\log 4)^2+3}{2\sqrt{\log 4}}$
(D) $\frac{8\log 2\log 4+3}{2\sqrt{\log 4}}$

Answer: (D) $\frac{8\log 2\log 4+3}{2\sqrt{\log 4}}$ · The council's preliminary key

Q12 AP EAPCET 2026 · 14 May · Shift 1 MCQ

If $y=\text{Sec}^{-1}\left(\frac{1+x^2}{2x}\right)$ and $x>1$, then $\frac{dy}{dx}=$

(A) $\frac{1}{1+x^2}$
(B) $\frac{2}{1+x^2}$
(C) $-\frac{1}{1+x^2}$
(D) $-\frac{2}{1+x^2}$

Answer: (B) $\frac{2}{1+x^2}$ · The council's preliminary key

Q13 AP EAPCET 2026 · 13 May · Shift 1 MCQ

If $\text{Tan}^{-1}x^2+\text{Tan}^{-1}y^2=\frac{\pi}{2}$, then $\left(\frac{dy}{dx}\right)_{(-1,2)}=$

(A) 0
(B) 1
(C) $\frac{1}{2}$
(D) $-\frac{1}{2}$

Answer: (C) $\frac{1}{2}$ · The council's preliminary key

Q14 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Let $f:\mathbb{R}\to\mathbb{R}$ be such that $f(2+x)=f(2-x)\ \forall\ x\in\mathbb{R}$. If $f(x)$ is twice differentiable such that $f'(1)=0$, then which one of the following is true?

(A) there exist at least one c in $(0,1)$ such that $f'(c)=0$
(B) there exist at least one c in $(1,2)$ such that $f''(c)=0$
(C) there exist at least one c in $(0,1)$ such that $f''(c)=0$
(D) there exist at least one c in $(1,2)$ such that $f'(c)=0$

Answer: (B) there exist at least one c in $(1,2)$ such that $f''(c)=0$ · The council's preliminary key

Q15 AP EAPCET 2026 · 13 May · Shift 2 MCQ

For $x>0$, derivative of $\text{Sin}^{-1}\left(\frac{1-x}{1+x}\right)$ with respect to $\sqrt{x}$ is

(A) $-\frac{2}{1+x}$
(B) $\frac{1}{2\sqrt{x}}$
(C) $-\frac{1}{1+x}$
(D) $-\frac{1}{\sqrt{x}(1+x)}$

Answer: (A) $-\frac{2}{1+x}$ · The council's preliminary key

Q16 AP EAPCET 2026 · 13 May · Shift 2 MCQ

If $x^2+y^2=t+\frac{1}{t}$ and $x^4+y^4=t^2+\frac{1}{t^2}$, then $x^3y\frac{dy}{dx}=$

(A) -1
(B) 0
(C) 1
(D) 2

Answer: (A) -1 · The council's preliminary key

Q17 AP EAPCET 2026 · 13 May · Shift 2 MCQ

If $x^2+y^2+\sin y=4$, then the value of $\frac{d^2y}{dx^2}$ at the point $(-2,0)$ is

(A) -34
(B) -32
(C) 34
(D) 32

Answer: (A) -34 · The council's preliminary key

Q18 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If $\tan(e^{3x})=\cot(e^{2y})$, then at $x=0$, $\frac{dy}{dx}=$

(A) $\frac{3}{2-\pi}$
(B) $\frac{2-\pi}{3}$
(C) $\frac{3}{\pi-2}$
(D) $\frac{\pi-2}{3}$

Answer: (A) $\frac{3}{2-\pi}$ · The council's preliminary key

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Q19 AP EAPCET 2026 · 12 May · Shift 1 MCQ

Let $f(x)=\log\left(\sqrt[4]{x^5}\right)+\frac{e^{-\frac{1}{x}}}{x^3}$

If $f'(x)=\frac{e^{-\frac{1}{x}}}{x^3}G(x)+\frac{k}{x}$, then the roots of $G(x)+k=0$ is

(A) $\frac{3}{4},1$

(B) $1,-3$

(C) $\frac{2}{5},2$

(D) $2,\frac{3}{4}$

Answer: (C) $\frac{2}{5},2$ · The council's preliminary key

Q20 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If $f(x)=\frac{x^2(\tan x)(\cos 2x)}{3^x(\log x)}$ and $f'(x)=f(x)g(x)$, then $g(x)+\log 3=$

(A) $\frac{2}{x}+\frac{1}{\sin x\cos x}-2\tan 2x-\frac{1}{x\log x}$

(B) $\frac{2x\log x-\tan 2x+\sin 2x}{x\log x}$

(C) $\frac{2}{x}+\frac{1}{x\sin x\cos x}-\sec 2x+\frac{1}{x\log x}$

(D) $\frac{1}{x}+\frac{1}{\sin 2x}-\tan 2x-\frac{1}{2x\log x}$

Answer: (A) $\frac{2}{x}+\frac{1}{\sin x\cos x}-2\tan 2x-\frac{1}{x\log x}$ · The council's preliminary key

Q21 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If Lagrange's mean value theorem is applied on the function $f(x)=3x+5$ in the interval $[-2\ ,2]$, then the entire set of values of 'c' of the Lagrange's mean value theorem is

(A) $\emptyset$ (Null Set)

(B) $\{-1,0,1\}$ only

(C) $(-2,2)-\{-1,0,1\}$

(D) $(-2,2)$

Answer: (D) $(-2,2)$ · The council's preliminary key

Q22 AP EAPCET 2026 · 12 May · Shift 2 MCQ

If $f(x)=\frac{4x}{3}+\cos x$ and $g(x)$ is the inverse of $f(x)$, then $g'(2\pi)=$

(A) $\frac{6}{11}$

(B) $\frac{1}{\pi}$

(C) $\frac{3}{7}$

(D) $\frac{2}{\pi}$

Answer: (C) $\frac{3}{7}$ · The council's preliminary key

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Q23 AP EAPCET 2026 · 12 May · Shift 2 MCQ

If Lagrange's mean value theorem is applied on the function $f(x) = \sin^{-1} x$ in the interval $\left[\frac{-1}{2}, \frac{1}{2}\right]$, then the value of c given in Lagrange's theorem is

(A) $\frac{\sqrt{4\pi^2-9}}{2\pi}$
(B) $\frac{\sqrt{\pi^2-9}}{\pi}$
(C) 0
(D) $\frac{\pi}{2}$

Answer: (B) $\frac{\sqrt{\pi^2-9}}{\pi}$ · The council's preliminary key

Q24 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If $y = \text{Tan}^{-1}\left[\left(\frac{1-\cos 2\sqrt{x}}{1+\cos 2\sqrt{x}}\right)^{1/2}\right]$, $0 < x < \frac{\pi^2}{4}$, then $y(2y' + y) =$

(A) 1
(B) $x + 1$
(C) $\sqrt{x}$
(D) $\sqrt{x} + 1$

Answer: (B) $x + 1$ · The council's preliminary key

Q25 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If $(3y)^{2x} = 5\left(2^{3x}\right)$, then $\left(\frac{dy}{dx}\right)_{x=1} =$

(A) $-\frac{\sqrt{10}\log 5}{3}$
(B) $-\frac{\sqrt{10}}{3}$
(C) $\frac{\sqrt{10}\log 5}{3}$
(D) $\frac{\sqrt{10}}{3}$

Answer: (A) $-\frac{\sqrt{10}\log 5}{3}$ · The council's preliminary key

Q26 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If $f(x) = x^3 - 19x + 30$ is a real valued function with $[-4, 1]$ as its domain, then the value of c according to Lagrange's mean value theorem for $f(x)$ is

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(A) $\sqrt{4.33}$

(B) -2

(C) $-\sqrt{4.33}$

(D) -3

Answer: (C) $-\sqrt{4.33}$ · The council's preliminary key

Q27 TS EAPCET 2026 · 11 May · Shift 2 MCQ

$\frac{d}{dx}\left(\text{Sin}^{-1}(\tan x)+\text{Tan}^{-1}(\sin x)\right)=$

(A) $\frac{1}{\cos x\sqrt{\cos 2x}}+\frac{2\cos x}{3-\cos 2x}$

(B) $\frac{\sec x}{\sqrt{1+\tan^2 x}}+\frac{\cos x}{1-\sin^2 x}$

(C) $\frac{\sec x\tan x}{\sqrt{\cos 2x}}+\frac{\sin x}{1+\cos 2x}$

(D) $\frac{\sec x}{1-\tan^2 x}+\frac{\cos x}{\sqrt{1+\sin^2 x}}$

Answer: (A) $\frac{1}{\cos x\sqrt{\cos 2x}}+\frac{2\cos x}{3-\cos 2x}$ · The council's preliminary key

Q28 TS EAPCET 2026 · 11 May · Shift 2 MCQ

$f(x)$ is a real valued bijective function and twice differentiable function. If $g(x)$ is inverse of $f(x)$ and $f(0)=\alpha$, then $g''(\alpha)=$

(A) $-\frac{f''(0)}{[f'(0)]^3}$

(B) $-\frac{f''(\alpha)}{[f'(\alpha)]^3}$

(C) $-\frac{f''(0)}{[f'(\alpha)]^2}$

(D) $-\frac{f''(\alpha)}{[f'(0)]^2}$

Answer: (A) $-\frac{f''(0)}{[f'(0)]^3}$ · The council's preliminary key

Q29 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If $y=\frac{x^4+x^2+1}{x^2+x+1}$, $\frac{dy}{dx}=y_1$ and $\frac{d^2y}{dx^2}=y_2$, then the value of $\left|\frac{\left(1+y_1^2\right)^{3/2}}{y_2}\right|$ at $x=\left(\frac{1}{2}+\sqrt{2}\right)$ is

(A) $12\sqrt{2}$

(B) $\frac{27}{\sqrt{2}}$

(C) $\frac{27}{2}$

(D) $\frac{30\sqrt{2}}{7}$

Answer: (C) $\frac{27}{2}$ · The council's preliminary key

Q30 TS EAPCET 2026 · 11 May · Shift 2 MCQ

$f(x)$ is a cubic polynomial and the curve represented by $y = f(x)$ passes through origin. The function $y = f(x)$ is an increasing function in $(-\infty, 0) \cup (1, \infty)$ and decreasing function in $(0, 1)$. If $f'(2) = 6$, then the c of the Lagrange's mean value theorem on the interval $[0, 2]$ satisfies the equation

(A) $3x^2 - x - 1 = 0$
(B) $3x^2 + 5x - 1 = 0$
(C) $3x^2 - 3x - 1 = 0$
(D) $3x^2 + 2x - 1 = 0$

Answer: (C) $3x^2 - 3x - 1 = 0$ · The council's preliminary key

Q31 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If $y = \text{Tan}^{-1}\left(\frac{\sqrt{1+9x^2}-1}{3x}\right)$ then $\left(\frac{dy}{dx}\right)_{x=1/3} =$

(A) $\frac{2}{3}$
(B) $\frac{1}{3}$
(C) $\frac{3}{4}$
(D) $\frac{1}{2}$

Answer: (C) $\frac{3}{4}$ · The council's preliminary key

Q32 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If $f(x) = (\log x)^{\sin x}$, $x > e$, then $f'(\pi) =$

(A) $\log \pi$
(B) $-\log \pi$
(C) $\log(\log \pi)$
(D) $-\log(\log \pi)$

Answer: (D) $-\log(\log \pi)$ · The council's preliminary key

Q33 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If $y = \left(x + \sqrt{x^2+1}\right)^5$ then $25y =$

(A) $(x^2+1)y_2 - xy_1$
(B) $(x^2+1)y_2 + xy_1$
(C) $(x^2+1)y_2 - 2xy_1$
(D) $(x^2+1)y_2 + 2xy_1$

Answer: (B) $(x^2+1)y_2 + xy_1$ · The council's preliminary key

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Q34 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If $y = \sin^{-1}\left(\frac{1-\cos 2x}{1+\sin^4 x}\right)$ then $\frac{dy}{dx} =$

(A) $\frac{2\cos 2x}{1+\sin^4 x}$
(B) $\frac{2\sin 2x}{1+\sin^4 x}$
(C) $\frac{2\cos 2x}{1+\sin^8 x}$
(D) $\frac{2\sin 2x}{1+\sin^8 x}$

Answer: (B) $\frac{2\sin 2x}{1+\sin^4 x}$ · The council's preliminary key

Q35 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If $f(x) = x^3 - 10x^2 + 31x - 30$ is a real valued function, then the number of values of c as stated in Rolle's theorem, that lie in the interval $(2, 5)$ is

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (C) 2 · The council's preliminary key

Q36 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If $y = e^{2x} + \sin x$, then $2y'' - 5y' + 2y =$

(A) $4\sin x$
(B) $-5\cos x$
(C) $-4\sin x$
(D) $5\cos x$

Answer: (B) $-5\cos x$ · The council's preliminary key

Q37 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If $x = \mathrm{Sin}^{-1}(\cos t)$ and $y = \mathrm{Tan}^{-1}(\cos t)$, then $\frac{dy}{dx} =$

(A) $\frac{\cos x}{1+\sin^2 x}$
(B) $\frac{\cos t}{1+\sin^2 t}$
(C) $\frac{\sin t}{1+\sin^2 t}$
(D) $\frac{\sin x}{1+\cos^2 x}$

Answer: (A) $\frac{\cos x}{1+\sin^2 x}$ · The council's preliminary key

Q38 TS EAPCET 2026 · 10 May · Shift 2 MCQ

$$\left[\frac{d}{dx}\left((\sin x)^{\cos x}\right)\right]_{x=\pi/4} =$$

(A) $\left(\frac{1}{\sqrt{2}}\right)^{\left(\frac{\sqrt{2}+1}{\sqrt{2}}\right)}\left(1+\log\sqrt{2}\right)$

(B) $\left(\frac{1}{\sqrt{2}}\right)^{\frac{1}{\sqrt{2}}}\left(1+\log\sqrt{2}\right)$

(C) $\left(\frac{1}{\sqrt{2}}\right)^{\frac{1}{\sqrt{2}}}\left(1-\log\sqrt{2}\right)$

(D) $\left(\frac{1}{\sqrt{2}}\right)^{\left(\frac{\sqrt{2}+1}{\sqrt{2}}\right)}\left(1-\log\sqrt{2}\right)$

Answer: (A) $\left(\frac{1}{\sqrt{2}}\right)^{\left(\frac{\sqrt{2}+1}{\sqrt{2}}\right)}\left(1+\log\sqrt{2}\right)$ · The council's preliminary key

Q39 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If c is the value lying in the interval $(1,3)$ such that Lagrange's mean value theorem holds for $f(x) = x^3 - 2x^2 + x - 1$ on $[1,3]$, then $9c^2 - 12c =$

(A) 15

(B) 18

(C) 24

(D) 27

Answer: (A) 15 · The council's preliminary key

Q40 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If $y = (e^{2x} - 4)(6e^{2x} - 5e^x + 1)$, then $\left(\frac{dy}{dx}\right)_{x=0} - \left(\frac{d^2y}{dx^2}\right)_{x=0} =$

(A) 0

(B) -5

(C) 4

(D) 6

Answer: (C) 4 · The council's preliminary key

Q41 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If $f(x)$ is a differentiable function and $y = e^{f(x)+e^{f(x)+e^{f(x)+\ldots\infty}}}$, then $\frac{dy}{dx} =$

(A) $\frac{yf'(x)}{1+y}$
(B) $\frac{(1+y)f'(x)}{y}$
(C) $\frac{(1-y)f'(x)}{y}$
(D) $\frac{yf'(x)}{1-y}$

Answer: (D) $\frac{yf'(x)}{1-y}$ · The council's preliminary key

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Q42 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If $\frac{d}{dx}\left(\frac{\sec x+\tan x}{\sec x-\tan x}\right)=k$ at $x=\frac{\pi}{4}$, then $\frac{k}{2\sqrt{2}}-2\sqrt{2}=$

(A) $5\sqrt{2}$
(B) $12\sqrt{2}$
(C) 3
(D) 9

Answer: (C) 3 · The council's preliminary key

Q43 TS EAPCET 2026 · 9 May · Shift 1 MCQ

A function is defined as $f(x)=\begin{cases}3x-1, & 0\le x\le 2\\ \sqrt{25(x-1)}, & 2\le x\le\infty\end{cases}$. For $f(x)$ in the interval $\left[\frac{1}{3},3\right]$

(A) only Rolle's theorem is applicable, but Lagrange's mean value theorem is not applicable
(B) Rolle's theorem is not applicable but Lagrange's mean value theorem is applicable
(C) Both Rolle's and Lagrange's theorems are applicable
(D) Both Rolle's and Lagrange's theorems are not applicable

Answer: (D) Both Rolle's and Lagrange's theorems are not applicable · The council's preliminary key

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Q44 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If $f(x)=\pi-\text{Cos}^{-1}\left(\frac{x^2+4x+3}{x^2+4x+5}\right)$, then $f'(1)=$

(A) $\frac{4}{5}$
(B) 2
(C) $\frac{1}{5}$
(D) -2

Answer: (C) $\frac{1}{5}$ · The council's preliminary key

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Q45 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If $x = \sin 2\theta + \sin 3\theta$, $y = \cos 2\theta - \cos 3\theta$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{35 + 6\cos\theta}{(2\cos 2\theta + 3\cos 3\theta)^3}$

(B) $\frac{19 + 6\cos\theta}{(2\cos 2\theta + 3\cos 3\theta)^3}$

(C) $\frac{35 + 6\cos 5\theta}{(2\cos 2\theta + 3\cos 3\theta)^3}$

(D) $\frac{19 + 6\cos 5\theta}{(2\cos 2\theta + 3\cos 3\theta)^3}$

Answer: (D) $\frac{19 + 6\cos 5\theta}{(2\cos 2\theta + 3\cos 3\theta)^3}$ · The council's preliminary key

Q46 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If $f(x) = (1 + x^3)(1 + x^6)(1 + x^{12})(1 + x^{24})$, then $f'(-1) =$

(A) 24

(B) 12

(C) 48

(D) 60

Answer: (A) 24 · The council's preliminary key

Q47 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If $x = \sqrt{2^{\text{cosec}^{-1} t}}$ and $y = \sqrt{2^{\sec^{-1} t}}$, $|t| \geq 1$ then $\frac{dy}{dx} =$

(A) $\frac{x}{y}$

(B) $\frac{y}{x}$

(C) $-\frac{y}{x}$

(D) $-\frac{x}{y}$

Answer: (C) $-\frac{y}{x}$ · The council's preliminary key

Q48 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If $(a + \sqrt{2}\,b\cos x)(a - \sqrt{2}\,b\cos y) = a^2 - b^2$ where $a > b > 0$, then at $\left(\frac{\pi}{4}, \frac{\pi}{4}\right)$, $\frac{dy}{dx} =$

(A) $\frac{a+b}{a-b}$
(B) $\frac{a-b}{a+b}$
(C) $\frac{a-2b}{a+2b}$
(D) $\frac{2a+b}{2a-b}$

Answer: (B) $\frac{a-b}{a+b}$ · The council's preliminary key

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Q49 AP EAPCET 2025 · 27 May · Shift 1 MCQ

Consider the quadratic equation $ax^2+bx+c=0$, where $2a+3b+6c=0$ and let

$$g(x)=\frac{ax^3}{3}+\frac{bx^2}{2}+cx.$$

Statement-I : The given quadratic equation $ax^2+bx+c=0$ has atleast one root in $(0,1)$.

Statement-II : Rolle's theorem is applicable to $g(x)$ on $[0,1]$.

Then

(A) Statement-I is false, Statement-II is true
(B) Statement-I is true, Statement-II is false
(C) Statement-I is true, Statement-II is true but Statement-II is not a correct explanation of Statement-I
(D) Statement-I is true, Statement-II is true and Statement-II is a correct explanation of Statement-I

Answer: (D) Statement-I is true, Statement-II is true and Statement-II is a correct explanation of Statement-I · The council's preliminary key

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Q50 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If $\sin x\sqrt{\cos y}-\cos y\sqrt{\sin x}=0$, then $\frac{dy}{dx}=$

(A) $\tan x$
(B) 1
(C) -1
(D) $-\cot x$

Answer: (C) -1 · The council's preliminary key

Q51 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If $y=(\log_x \sin x)^x$, then $\frac{dy}{dx}=$

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(A) $y\left[\frac{x\sin x}{\log\cos x}+\log(\log\sin x)+\frac{1}{\log x}-\log(\log x)\right]$

(B) $y\left[\frac{x\cos x}{\log\sin x}-\log(\log\sin x)+\frac{1}{\log x}+\log(\log x)\right]$

(C) $y\left[\frac{x\cot x}{\log\sin x}+\log(\log\sin x)-\frac{1}{\log x}-\log(\log x)\right]$

(D) $y\left[\frac{x\cot x}{\log\sin x}-\log(\log\sin x)+\frac{1}{\log x}-\log x\right]$

Answer: (C) $y\left[\frac{x\cot x}{\log\sin x}+\log(\log\sin x)-\frac{1}{\log x}-\log(\log x)\right]$ · The council's preliminary key

Q52 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If the Lagrange's mean value theorem is applied to the function $f(x)=e^x$ defined on the interval $[1,2]$ and the value of $c\in(1,2)$ is k, then $e^{k-1}=$

(A) 2

(B) $e-1$

(C) $e+1$

(D) 1

Answer: (B) $e-1$ · The council's preliminary key

Q53 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If $y=At^2+\frac{B}{t}$ (A, B are parameters) is general solution of the differential equation $f(t)\,y''(t)+g(t)\,y'(t)+h(t)\,y=0$ then $2f(t)+t^2h(t)=$

(A) $g(t)-h(t)$

(B) $g(t)+f(t)$

(C) $g(t)\,f(t)$

(D) $(f(t))^{g(t)}$

Answer: (C) $g(t)\,f(t)$ · The council's preliminary key

Q54 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If $y=\mathrm{Sin}^{-1}\left(\frac{2x}{1+x^2}\right)$ and $\left(\frac{d^2y}{dx^2}\right)_{x=2}=k$, then $25k=$

(A) $(-3)^2$

(B) $(-2)^3$

(C) 3

(D) $(-2)^5$

Answer: (B) $(-2)^3$ · The council's preliminary key

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Q55 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If $f(x) = x^{\sec^{-1} x}$, then $f'(2) =$

(A) $\frac{2^{\pi/3}}{6}(\pi - \sqrt{3}\log 2)$

(B) $\frac{2^{\pi/6}}{6}(\pi + \sqrt{3}\log 2)$

(C) $\frac{2^{\pi/3}}{6}(\pi + \sqrt{3}\log 2)$

(D) $\frac{2^{\pi/6}}{6}(\pi - \sqrt{3}\log 2)$

Answer: (C) $\frac{2^{\pi/3}}{6}(\pi + \sqrt{3}\log 2)$ · The council's preliminary key

Q56 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If $f(x) = \text{Sec}^{-1}\left(\frac{1}{2x^2-1}\right)$ and $g(x) = \text{Tan}^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, then the derivative of $f(x)$ with respect to $g(x)$ is

(A) $\frac{1+x^2}{4\sqrt{1-x^2}}$

(B) $\frac{(1-x^2)}{4\sqrt{1+x^2}}$

(C) $-\frac{4(1-x^2)}{\sqrt{1+x^2}}$

(D) $-\frac{4(1+x^2)}{\sqrt{1-x^2}}$

Answer: (D) $-\frac{4(1+x^2)}{\sqrt{1-x^2}}$ · The council's preliminary key

Q57 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If the function $f(x) = x^3 + bx^2 + cx - 6$ satisfies all the conditions of Rolle's theorem in $[1, 3]$ and $f'\left(\frac{2\sqrt{3}+1}{\sqrt{3}}\right) = 0$, then $bc =$

(A) 18

(B) -66

(C) 38

(D) -46

Answer: (B) -66 · The council's preliminary key

Q58 AP EAPCET 2025 · 24 May · Shift 1 MCQ

If $y = \text{Tan}^{-1}\left(\frac{3x-x^3}{1-3x^2}\right) + \text{Tan}^{-1}\left(\frac{7x}{1-12x^2}\right)$, then at $x = 0$, $\frac{dy}{dx} =$

(A) 6
(B) 7
(C) 9
(D) 10

Answer: (D) 10 · The council's preliminary key

Q59 AP EAPCET 2025 · 24 May · Shift 1 MCQ

If $y = \sqrt{\dfrac{x^4\sqrt{3x-5}}{(x^2-3)(2x-3)}}$, then $\left(\dfrac{dy}{dx}\right)_{x=2} =$

(A) 5
(B) 0
(C) 1
(D) -5

Answer: (D) -5 · The council's preliminary key

Q60 AP EAPCET 2025 · 24 May · Shift 1 MCQ

If $x^2 + y^2 + \sin y = 4$, then the value of $\frac{d^2y}{dx^2}$ at $x = -2$ is

(A) -30
(B) -34
(C) -32
(D) -18

Answer: (B) -34 · The council's preliminary key

Q61 AP EAPCET 2025 · 23 May · Shift 1 MCQ

If $y = \log(\sec(\mathrm{Tan}^{-1}x))\,(x > 0)$, then $\dfrac{dy}{dx}$ at $x = 1$ is

(A) 1
(B) 3
(C) $\dfrac{1}{2}$
(D) $\dfrac{3}{2}$

Answer: (C) $\dfrac{1}{2}$ · The council's preliminary key

Q62 AP EAPCET 2025 · 23 May · Shift 1 MCQ

If $y = \mathrm{Sin}^{-1}\left(\dfrac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$ and $\dfrac{-3\pi}{2} < x < \dfrac{-\pi}{2}$, then $\dfrac{dy}{dx} =$

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(A) $-\dfrac{\left|\operatorname{cosec}\dfrac{x}{2}\right|}{2\sqrt{\sin^2\dfrac{x}{2}-\cos^2\dfrac{x}{2}}}$

(B) $\dfrac{\left|\sec\dfrac{x}{2}\right|}{2\sqrt{\cos x}}$

(C) $\dfrac{\left|\cos\dfrac{x}{2}\right|}{2\sqrt{\cos x}}$

(D) $\dfrac{\cos\dfrac{x}{2}}{\sqrt{\cos x}}$

Answer: (B) $\dfrac{\left|\sec\dfrac{x}{2}\right|}{2\sqrt{\cos x}}$ · The council's preliminary key

Q63 AP EAPCET 2025 · 23 May · Shift 1 MCQ

If $x=\sqrt{2}\,e^t(\sin t-\cos t)$ and $y=\sqrt{2}\,e^t(\sin t+\cos t)$, then $\left(\dfrac{d^2y}{dx^2}\right)_{t=\frac{\pi}{4}}=$

(A) $-e^{-\pi/4}$

(B) $\sqrt{2}\,e^{\pi/4}$

(C) $\sqrt{2}\,e^{-\pi/4}$

(D) $e^{-\pi/4}$

Answer: (A) $-e^{-\pi/4}$ · The council's preliminary key

Q64 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If $y=\sqrt{\cosh x+\sqrt{\cosh x}}$, then $\dfrac{dy}{dx}=$

(A) $\dfrac{\sinh x\left(2y^2+2\cosh x+1\right)}{4y\left(y^2+\cosh x\right)}$

(B) $\dfrac{\sinh x(2y^2-2\cosh x-1)}{4y(y^2-\cosh x)}$

(C) $\dfrac{\sinh x(1-2\sqrt{\cosh x})}{4y\sqrt{\cosh x}}$

(D) $\dfrac{\sinh x(1+2\sqrt{\cosh x})}{4y\sqrt{\cosh x}}$

Answer: (D) $\dfrac{\sinh x(1+2\sqrt{\cosh x})}{4y\sqrt{\cosh x}}$ · The council's preliminary key

Q65 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If $y=\operatorname{Tan}^{-1}\sqrt{x^2-1}+\operatorname{Sinh}^{-1}\sqrt{x^2-1}$, $x>1$, then $\dfrac{dy}{dx}=$

(A) $\frac{1}{x\sqrt{x^2-1}}$
(B) $\frac{x+1}{x\sqrt{x^2-1}}$
(C) $\frac{x+1}{x^2\sqrt{x^2-1}}$
(D) $\frac{x}{\sqrt{x^2-1}}$

Answer: (B) $\frac{x+1}{x\sqrt{x^2-1}}$ · The council's preliminary key

Q66 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If $y=(\log x)^{1/x}+x^{\log x}$, at $x=e$, $\frac{dy}{dx}=$

(A) $2+\frac{1}{e}$
(B) $e^2+\frac{1}{2}$
(C) $\frac{1}{e^2}+2$
(D) $e+\frac{1}{e}$

Answer: (C) $\frac{1}{e^2}+2$ · The council's preliminary key

Q67 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If $x=2\cos^3\theta$ and $y=3\sin^2\theta$, then $\frac{dy}{dx}=$

(A) $-\sec\theta$
(B) $\cos\theta$
(C) $-\operatorname{cosec}\theta$
(D) $\sin\theta$

Answer: (A) $-\sec\theta$ · The council's preliminary key

Q68 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If g is the inverse of the function f(x) and $g(x)=x+\tan x$ then, $f'(x)=$

(A) $1+\sec^2 x$
(B) $\frac{1}{1+\sec^2 f(x)}$
(C) $\frac{1}{1+\sec^2 g(x)}$
(D) $1+\sec^2 f(x)$

Answer: (B) $\frac{1}{1+\sec^2 f(x)}$ · The council's preliminary key

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Q69 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If $\sqrt{x-xy}+\sqrt{y-xy}=1$, then $\frac{dy}{dx}=$

(A) $-\sqrt{\frac{y-y^2}{x-x^2}}$

(B) $-\sqrt{\frac{1-y^2}{1-x^2}}$

(C) $-\sqrt{\frac{1-y}{1-x}}$

(D) $-\sqrt{\frac{x-y}{x+y}}$

Answer: (A) $-\sqrt{\frac{y-y^2}{x-x^2}}$ · The council's preliminary key

Q70 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If $y=\mathrm{Tan}^{-1}\left(\frac{x}{1+2x^2}\right)+\mathrm{Tan}^{-1}\left(\frac{x}{1+6x^2}\right)$, then $\frac{dy}{dx}=$

(A) $\frac{4}{16x^2+1}-\frac{3}{9x^2+1}$

(B) $\frac{3}{9x^2+1}-\frac{1}{x^2+1}$

(C) $\frac{3}{9x^2+1}-\frac{2}{4x^2+1}$

(D) $\frac{1}{9x^2+1}-\frac{1}{x^2+1}$

Answer: (B) $\frac{3}{9x^2+1}-\frac{1}{x^2+1}$ · The council's preliminary key

Q71 AP EAPCET 2025 · 21 May · Shift 1 MCQ

The derivative of $\mathrm{Sec}^{-1}\left(\frac{1}{2x^2-1}\right)$ with respect to $\sqrt{1-x^2}$ at $x=\frac{1}{2}$ is

(A) -2

(B) 1

(C) 2

(D) 4

Answer: (D) 4 · The council's preliminary key

Q72 AP EAPCET 2025 · 21 May · Shift 1 MCQ

The value c of the Rolle's theorem for the function $f(x)=2\sin x+\sin 2x$ in the interval $[0,\pi]$ is

(A) $\frac{\pi}{2}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{4}$

(D) $\frac{\pi}{3}$

Answer: (D) $\frac{\pi}{3}$ · The council's preliminary key

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Q73 AP EAPCET 2025 · 21 May · Shift 1 MCQ

Consider the following functions

I) $f(x)=\begin{cases}\frac{1}{2}-x, & x<\frac{1}{2}\\ \left(\frac{1}{2}-x\right)^2, & x\geq\frac{1}{2}\end{cases}$

II) $f(x)=|3x-1|$

III) $f(x)=x|x|$

IV) $f(x)=|x|$

Then on $[0,1]$ Lagrange's mean value theorem is applicable to the functions

(A) III, IV

(B) II, III

(C) I, III

(D) II, IV

Answer: (A) III, IV · The council's preliminary key

Q74 AP EAPCET 2025 · 21 May · Shift 2 MCQ

If $x^2+y^2=t-\frac{1}{t}$ and $x^4+y^4=t^2+\frac{1}{t^2}$, then $\frac{dy}{dx}=$

(A) $\frac{y}{x}$

(B) $\frac{y^2}{x^2}$

(C) $\sqrt{\frac{y}{x}}$

(D) $-\frac{y}{x}$

Answer: (D) $-\frac{y}{x}$ · The council's preliminary key

Q75 AP EAPCET 2025 · 21 May · Shift 2 MCQ

If $y=(ax+b)\cos x$, then $y_2+y_1\sin 2x+y(1+\sin^2 x)=$

(A) $y_2\cos^2 x$

(B) $y_2\sin^2 x$

(C) $y_1\sin^2 x$

(D) $y\sin^2 x$

Answer: (B) $y_2\sin^2 x$ · The council's preliminary key

Q76 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If $x=2\sqrt{2}\sqrt{\cos 2\theta}$ and $y=2\sqrt{2}\sqrt{\sin 2\theta}$, $0<\theta<\frac{\pi}{4}$ then the value of $\frac{dy}{dx}$ at $\theta=22\frac{1}{2}^\circ$ is

(A) 1
(B) -1
(C) 0
(D) $\sqrt{3}$

Answer: (B) -1 · The council's preliminary key

Q77 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If $y = \tan^2\left(\text{Cos}^{-1}\sqrt{\frac{1+x^2}{2}}\right)$, then $\frac{dy}{dx} =$

(A) $-\frac{4x}{(1-x^2)^2}$
(B) $\frac{4x}{(1+x^2)^2}$
(C) $-\frac{4x}{(1+x^2)^2}$
(D) $-\frac{4x}{1+x^2}$

Answer: (C) $-\frac{4x}{(1+x^2)^2}$ · The council's preliminary key

Q78 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If $y = x^{\log x} + (\log x)^x$, $x > 1$ then $\left(\frac{dy}{dx}\right)_{x=e} =$

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (D) 3 · The council's preliminary key

Q79 TS EAPCET 2025 · 4 May · Shift 2 MCQ

If $y = f(x)^{g(x)}$ and $\frac{dy}{dx} = y\left[H(x)f'(x) + G(x)g'(x)\right]$, then $\int \frac{G(x)H(x)f'(x)}{g(x)}\,dx =$

(A) $\log(\log f(x)) + c$
(B) $\frac{[\log f(x)]^2}{2} + c$
(C) $\frac{\log f(x)}{2} + c$
(D) $x^2 + c$

Answer: (B) $\frac{[\log f(x)]^2}{2} + c$ · The council's preliminary key

Q80 TS EAPCET 2025 · 4 May · Shift 2 MCQ

If $x = t - \sin t$, $y = 1 - \cos t$ and $\frac{d^2y}{dx^2} = -1$ at $t = K$, $K > 0$, then $\underset{t\to K}{\text{Lt}}\,\frac{y}{x} =$

(A) $\frac{2}{\pi}$

(B) $\frac{\pi-2}{2}$

(C) $\frac{2}{\pi-2}$

(D) $\frac{\pi}{2}$

Answer: (C) $\frac{2}{\pi-2}$ · The council's preliminary key

Q81 TS EAPCET 2025 · 4 May · Shift 2 MCQ

Consider all functions given in List-I in the interval $[1,3]$. The List-2 has the values of 'c' obtained by applying Lagrange's mean value theorem on the functions of List-1. Match the functions and values of 'c'.

List-1	List-2
A $\lvert x-1\rvert$	I $2\log(e^3+e^2)$
B $\log x$	II 2
C x^2+x+1	III $\log_3 e^2$
D e^x	IV $\sqrt{2}$
	V $\log\left(\frac{e^3-e}{2}\right)$

(A) A – II, B – V, C – IV, D – III

(B) A – II, B – I, C – IV, D – III

(C) A – IV, B – V, C – II, D – I

(D) A – IV, B – III, C – II, D – V

Answer: (D) A – IV, B – III, C – II, D – V · The council's preliminary key

Q82 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If $3^x y^x = x^{3y}$ then the value of $\frac{dy}{dx}$ at $x=1$ is

(A) -3

(B) 3

(C) $-\frac{1}{3}$

(D) $\frac{1}{3}$

Answer: (D) $\frac{1}{3}$ · The council's preliminary key

Q83 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If $y=(1-x^2)\text{Tanh}^{-1}x$ then $\frac{d^2y}{dx^2}=$

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(A) $\frac{2xy}{(1+x^2)^2}$

(B) $-\frac{(x+y)}{(1-x^2)^2}$

(C) $\frac{2(xy)}{1-x^2}$

(D) $-\frac{2(x+y)}{1-x^2}$

Answer: (D) $-\frac{2(x+y)}{1-x^2}$ · The council's preliminary key

Q84 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If $f(x)=\log_{(x^2-2x+1)}(x^2-3x+2),\ x\in\mathbb{R}-[1,2]$ and $x\neq 0$, then $f'(3)=$

(A) 1

(B) 0

(C) $\log_e 4$

(D) $\log_4 e$

Answer: (D) $\log_4 e$ · The council's preliminary key

Q85 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If $y=\sqrt{\log(x^2+1)+\sqrt{\log(x^2+1)+\sqrt{\log(x^2+1)+\ldots\infty}}}$, $|x|<1$, then $\frac{dy}{dx}=$

(A) $\frac{x^2+1}{2y-1}$

(B) $\frac{2x}{2y-1}$

(C) $\frac{1}{(x^2+1)(2y-1)}$

(D) $\frac{2x}{(x^2+1)(2y-1)}$

Answer: (D) $\frac{2x}{(x^2+1)(2y-1)}$ · The council's preliminary key

Q86 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If $x=\sqrt{1-\tan y}$, then $\frac{dy}{dx}=$

(A) $\frac{2x}{x^4+2x^2+2}$
(B) $-\frac{2x}{x^4-2x^2+2}$
(C) $\frac{2x}{x^4-2x^2+2}$
(D) $-\frac{2x}{x^4+2x^2+2}$

Answer: (B) $-\frac{2x}{x^4-2x^2+2}$ · The council's preliminary key

Q87 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If $y=\text{Sec}^{-1}x$, then $\frac{d^2y}{dx^2}=$

(A) $\frac{1-2x^2}{x|x|\left(x^2-1\right)^{\frac{3}{2}}}$
(B) $\frac{1-x^2}{x^2\left(x^2-1\right)^{\frac{3}{2}}}$
(C) $\frac{1-x^2}{-x^2\left(x^2-1\right)^{\frac{3}{2}}}$
(D) $\frac{1+2x^2}{x|x|\left(x^2-1\right)^{\frac{3}{2}}}$

Answer: (A) $\frac{1-2x^2}{x|x|\left(x^2-1\right)^{\frac{3}{2}}}$ · The council's preliminary key

Q88 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If $x=\sin 2\theta\cos 3\theta,\ y=\sin 3\theta\cos 2\theta$, then $\frac{dy}{dx}=$

(A) $\frac{2\cos 5\theta+\sin 3\theta\sin 2\theta}{2\cos 5\theta-\cos 3\theta\cos 2\theta}$
(B) $\frac{2\cos 5\theta-\sin 3\theta\sin 2\theta}{2\cos 5\theta+\cos 3\theta\cos 2\theta}$
(C) $\frac{2\cos 5\theta+\cos 3\theta\cos 2\theta}{2\cos 5\theta-\sin 3\theta\sin 2\theta}$
(D) $\frac{2\cos 5\theta-\sin 3\theta\sin 2\theta}{2\cos 5\theta-\cos 3\theta\cos 2\theta}$

Answer: (C) $\frac{2\cos 5\theta+\cos 3\theta\cos 2\theta}{2\cos 5\theta-\sin 3\theta\sin 2\theta}$ · The council's preliminary key

Q89 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If $f(x)=\sqrt{\cos^{-1}\sqrt{1-x^2}}$, then $f'\left(\frac{1}{2}\right)=$

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(A) $\sqrt{\frac{2}{\pi}}$
(B) $\sqrt{\frac{\pi}{2}}$
(C) $-\sqrt{\frac{2}{\pi}}$
(D) $-\sqrt{\frac{\pi}{2}}$

Answer: (A) $\sqrt{\frac{2}{\pi}}$ · The council's preliminary key

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Q90 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If $y = f(\cosh x)$ and $f'(x) = \log\left(x + \sqrt{x^2 - 1}\right)$ then $\frac{d^2y}{dx^2} =$

(A) $\sinh x + x\cosh x$
(B) $x\sinh x$
(C) $\log\left(x + \sqrt{x^2 + 1}\right)$
(D) $\frac{x\left(2\sqrt{x^2-1}+1\right)}{\sqrt{x^2-1}\left(x^2+\sqrt{x^2-1}\right)}$

Answer: (A) $\sinh x + x\cosh x$ · The council's preliminary key

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Q91 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If $(x^2 - 3x + 2)e^{\frac{y}{x-1}} = x + 2$ then $\left(\frac{dy}{dx}\right)_{x=0} =$

(A) 2
(B) -2
(C) 1
(D) -1

Answer: (B) -2 · The council's preliminary key

Q92 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If $x = \frac{t^2}{1+t^5}$, $y = \frac{2t^3}{1+t^5}$ and $t \neq -1$ is a parameter then $\frac{dy}{dx} =$

(A) $\frac{2\left(3+2t^5\right)}{\left(2-3t^5\right)}$
(B) $\frac{2t\left(3-2t^5\right)}{\left(2-3t^5\right)}$
(C) $\frac{2t\left(3-2t^5\right)}{\left(2+3t^5\right)}$
(D) $\frac{2\left(3+2t^5\right)}{\left(2+3t^5\right)}$

Answer: (B) $\frac{2t\left(3-2t^5\right)}{\left(2-3t^5\right)}$ · The council's preliminary key

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Q93 TS EAPCET 2025 · 2 May · Shift 2 MCQ

Consider the following statements

Assertion (A): For $x \in \mathbb{R} - \{1\}$, $\frac{d}{dx}\left(\text{Tan}^{-1}\left(\frac{1+x}{1-x}\right)\right) = \frac{d}{dx}\left(\text{Tan}^{-1}x\right)$

Reason (R): For $x < 1$, $\text{Tan}^{-1}\left(\frac{1+x}{1-x}\right) = \frac{\pi}{4} + \text{Tan}^{-1}x$,

for $x > 1$, $\text{Tan}^{-1}\left(\frac{1+x}{1-x}\right) = -\frac{3\pi}{4} + \text{Tan}^{-1}x$

The correct answer is

(A) Both (A) and (R) are true, (R) is the correct explanation of (A)

(B) Both (A) and (R) are true, (R) is not the correct explanation of (A)

(C) (A) is true, but (R) is false

(D) (A) is false, but (R) is true

Answer: (A) Both (A) and (R) are true, (R) is the correct explanation of (A) · The council's preliminary key

Q94 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If $\frac{d}{dx}\left\{\left(\frac{x-1}{x-\sqrt{x}}\right)e^{2x+1}\right\} = \frac{x-1}{x-\sqrt{x}}e^{2x+1}f(x)$, then $f(4) =$

(A) 0

(B) 1

(C) $\frac{35}{24}$

(D) $\frac{47}{24}$

Answer: (D) $\frac{47}{24}$ · The council's preliminary key

Q95 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If $y = (\sin^{-1}x)^2$, then $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} =$

(A) $\frac{1}{2}$

(B) 2

(C) $-\frac{1}{2}$

(D) 4

Answer: (B) 2 · The council's preliminary key

Q96 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If $f : [a,b] \to [c,d]$ is a continuous and strictly increasing function, then $\frac{d-c}{b-a}$ is

(A) Value of the function at a point $t \in (a, b)$
(B) Value of the function at $t \in (a, b)$ such that $f'(t) = 0$
(C) Slope of the tangent drawn to the curve $y = f(t)$ at a point $t \in (c, d)$
(D) Slope of the tangent drawn to the curve $y = f(t)$ at a point $t \in (a, b)$

Answer: (D) Slope of the tangent drawn to the curve $y = f(t)$ at a point $t \in (a, b)$ · The council's preliminary key

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Q97 AP EAPCET 2024 · 23 May · Shift 1 MCQ

If $y = (x-1)(x+2)(x^2+5)(x^4+8)$, then $\lim_{x \to -1} \left(\frac{dy}{dx}\right) =$

(A) -30
(B) 30
(C) 52
(D) -52

Answer: (B) 30 · The council's preliminary key

Q98 AP EAPCET 2024 · 23 May · Shift 1 MCQ

In each of the following options, a function and an interval are given. Choose the option containing the function and the interval for which Lagrange's mean value theorem is not applicable

(A) $f(x) = |x|;\ 1 \le x \le 5$
(B) $f(x) = [x],\ [\sqrt{2}, \sqrt{3}]$
(C) $f(x) = \log(x^2 - 1),\ \left[\frac{1}{e}, e-2\right]$
(D) $f(x) = e^x;\ [-e, e]$

Answer: (C) $f(x) = \log(x^2 - 1),\ \left[\frac{1}{e}, e-2\right]$ · The council's preliminary key

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Q99 AP EAPCET 2024 · 23 May · Shift 1 MCQ

If $y = (\text{Tan}^{-1}2x)^2 + (\text{Cot}^{-1}2x)^2$, then $(1+4x^2)^2 y'' - 16 =$

(A) $8x\,y'$
(B) $-8x(1+4x^2)y'$
(C) $8x(1+4x^2)y'$
(D) $-8xy'$

Answer: (B) $-8x(1+4x^2)y'$ · The council's preliminary key

Q100 AP EAPCET 2024 · 22 May · Shift 1 MCQ

If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \cdots \infty}}}$ then the value of $\frac{d^2y}{dx^2}$ at the point $(\pi, 1)$ is

(A) 2
(B) -2
(C) $-\frac{1}{2}$
(D) $\frac{1}{2}$

Answer: (B) -2 · The council's preliminary key

Q101 AP EAPCET 2024 · 22 May · Shift 1 MCQ

If $f(0)=0$, $f'(0)=3$, then the derivative of $y=f(f(f(f(f(x)))))$ at $x=0$ is

(A) 16
(B) 32
(C) 81
(D) 243

Answer: (D) 243 · The council's preliminary key

Q102 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The value c of Lagrange's mean value theorem for $f(x)=e^x+24$ in $[0,1]$ is

(A) $\log(e-1)$
(B) $\log(e+1)$
(C) $\log(e+24)$
(D) $\log(e-24)$

Answer: (A) $\log(e-1)$ · The council's preliminary key

Q103 AP EAPCET 2024 · 22 May · Shift 2 MCQ

If $y=\mathrm{Tan}^{-1}\frac{x}{1+2x^2}+\mathrm{Tan}^{-1}\frac{x}{1+6x^2}+\mathrm{Tan}^{-1}\frac{x}{1+12x^2}$, then $\left(\frac{dy}{dx}\right)_{x=\frac{1}{2}}=$

(A) 1
(B) -1
(C) 0
(D) $\frac{1}{2}$

Answer: (C) 0 · The council's preliminary key

Q104 AP EAPCET 2024 · 22 May · Shift 2 MCQ

If $f(x)=5\cos^3 x-3\sin^2 x$ and $g(x)=4\sin^3 x+\cos^2 x$, then the derivative of $f(x)$ with respect to $g(x)$ is

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(A) $\frac{5\cos x+2}{6\cos x-1}$
(B) $-\left(\frac{5\cos x+2}{6\cos x-1}\right)$
(C) $\frac{15\cos x-6}{12\sin x+2}$
(D) $-\left(\frac{15\cos x+6}{12\sin x-2}\right)$

Answer: (D) $-\left(\frac{15\cos x+6}{12\sin x-2}\right)$ · The council's preliminary key

Q105 AP EAPCET 2024 · 22 May · Shift 2 MCQ

If $y = 1 + x + x^2 + x^3 + \ldots\infty$ and $|x| < 1$, then $y'' =$

(A) $2yy'$
(B) $\frac{2y}{y'}$
(C) $\frac{y'}{2y}$
(D) $2y^2y'$

Answer: (A) $2yy'$ · The council's preliminary key

Q106 AP EAPCET 2024 · 21 May · Shift 1 MCQ

The rate of change of $x^{\sin x}$ with respect to $(\sin x)^x$ is

(A) $\frac{x^{\sin x}\left(\frac{\sin x}{x}+\cos x\cdot\log x\right)}{(\sin x)^x(x\cdot\cot x+\log\sin x)}$
(B) $\frac{(\sin x)^x(x\cot x+\log\sin x)}{x^{\sin x}\left(\frac{\sin x}{x}+\cos x\cdot\log x\right)}$
(C) $y\left(\frac{\sin x}{x}+\cos x\cdot\log x\right)$
(D) $(\sin x)^x(x\cot x+\log\sin x)$

Answer: (A) $\frac{x^{\sin x}\left(\frac{\sin x}{x}+\cos x\cdot\log x\right)}{(\sin x)^x(x\cdot\cot x+\log\sin x)}$ · The council's preliminary key

Q107 AP EAPCET 2024 · 21 May · Shift 1 MCQ

If $y = \frac{\alpha x+\beta}{\gamma x+\delta}$, then $2y_1y_3 =$

(A) $2y_2^3$
(B) $3y_2^2$
(C) y_2^2
(D) $3y_3^2$

Answer: (B) $3y_2^2$ · The council's preliminary key

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Q108 AP EAPCET 2024 · 21 May · Shift 1 MCQ

Which one of the following is false?

(A) $\frac{d}{dx}[\text{Sec}^{-1}(\cosh x)] = \text{sech}\, x$

(B) $\frac{d}{dx}[\text{Cos}^{-1}(\text{sech}\, x)] = \text{sech}\, x$

(C) $\frac{d}{dx}[\text{Tan}^{-1}(\sinh x)] = \text{sech}\, x$

(D) $\frac{d}{dx}\left[\text{Tan}^{-1}\left(\tan\frac{x}{2}\right)\right] = \sec x$

Answer: (D) $\frac{d}{dx}\left[\text{Tan}^{-1}\left(\tan\frac{x}{2}\right)\right] = \sec x$ · The council's preliminary key

Q109 AP EAPCET 2024 · 21 May · Shift 1 MCQ

If the Rolle's theorem is applicable for the function $f(x)$ defined by $f(x) = x^3 + Px - 12$ on $[0, 1]$, then the value of C of the Rolle's theorem is

(A) $\pm\frac{1}{\sqrt{3}}$

(B) $-\frac{1}{\sqrt{3}}$

(C) $\frac{1}{\sqrt{3}}$

(D) $\frac{1}{3}$

Answer: (C) $\frac{1}{\sqrt{3}}$ · The council's preliminary key

Q110 AP EAPCET 2024 · 21 May · Shift 2 MCQ

If $\frac{d}{dx}\left(\frac{1+x^2+x^4}{1+x+x^2}\right) = ax + b$ then $(a, b) =$

(A) $(-1, 2)$

(B) $(-2, 1)$

(C) $(2, -1)$

(D) $(1, 2)$

Answer: (C) $(2, -1)$ · The council's preliminary key

Q111 AP EAPCET 2024 · 21 May · Shift 2 MCQ

If $y = \sin^{-1} x$ then $(1 - x^2)y_2 - xy_1 =$

(A) 0

(B) 1

(C) 2

(D) $2y$

Answer: (A) 0 · The council's preliminary key

Q112 AP EAPCET 2024 · 20 May · Shift 1 MCQ

If $y = \tan(\log x)$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{-\sec^2(\log x)[1 + 2\tan x]}{x^2}$

(B) $\frac{\sec^2(\log x)[1 + \tan(\log x)]}{x^2}$

(C) $\frac{\sec(\log x)[2\tan(\log x) - 1]}{x^2}$

(D) $\frac{\sec^2(\log x)[2\tan(\log x) - 1]}{x^2}$

Answer: (D) $\frac{\sec^2(\log x)[2\tan(\log x) - 1]}{x^2}$ · The council's preliminary key

Q113 AP EAPCET 2024 · 20 May · Shift 1 MCQ

For $x < 0$, $\frac{d}{dx}[|x|^x] =$

(A) $(-x)^x[-1 + \log(-x)]$

(B) $(-x)^x[1 + \log(-x)]$

(C) $(-x)^x[1 - \log(-x)]$

(D) $(-x)^x[-1 - \log(-x)]$

Answer: (B) $(-x)^x[1 + \log(-x)]$ · The council's preliminary key

Q114 AP EAPCET 2024 · 20 May · Shift 1 MCQ

If $y = x - x^2$, then the rate of change of y^2 with respect to x^2 at $x = 2$ is

(A) 0

(B) -1

(C) 3

(D) 9

Answer: (C) 3 · The council's preliminary key

Q115 AP EAPCET 2024 · 20 May · Shift 1 MCQ

If the function $f(x) = \sqrt{x^2 - 4}$ satisfies the Lagrange's mean value theorem on $[2, 4]$, then the value of C is

(A) $2\sqrt{3}$

(B) $-2\sqrt{3}$

(C) $\sqrt{6}$

(D) $-\sqrt{6}$

Answer: (C) $\sqrt{6}$ · The council's preliminary key

Q116 AP EAPCET 2024 · 20 May · Shift 2 MCQ

If $y = t^2 + t^3$ and $x = t - t^4$ then $\frac{d^2y}{dx^2}$ at $t = 1$ is

(A) $-2/3$

(B) $-4/3$

(C) $8/3$

(D) 4

Answer: (B) $-4/3$ · The council's preliminary key

Q117 AP EAPCET 2024 · 20 May · Shift 2 MCQ

A value of C according to the Lagrange's mean value theorem for $f(x) = (x-1)(x-2)(x-3)$ in $[0, 4]$ is

(A) $2 + \frac{2}{\sqrt{3}}$

(B) $2 - \sqrt{\frac{16}{3}}$

(C) $1 + \sqrt{\frac{5}{4}}$

(D) $2 + \sqrt{\frac{8}{3}}$

Answer: (A) $2 + \frac{2}{\sqrt{3}}$ · The council's preliminary key

Q118 AP EAPCET 2024 · 19 May · Shift 2 MCQ

If $y = f(x)$ is a thrice differentiable function and a bijection then $\frac{d^2x}{dy^2}\left(\frac{dy}{dx}\right)^3 + \frac{d^2y}{dx^2} =$

(A) y

(B) $-y$

(C) x

(D) 0

Answer: (D) 0 · The council's preliminary key

Q119 AP EAPCET 2024 · 19 May · Shift 2 MCQ

If Rolle's theorem is applicable for the function $f(x) = x(x+3)e^{-x/2}$ on $[-3, 0]$, then the value of c is

(A) 3

(B) 3 and -2

(C) -2

(D) -1

Answer: (C) -2 · The council's preliminary key

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Q120 AP EAPCET 2024 · 19 May · Shift 2 MCQ

For all $x \in [0, 2024]$ assume that $f(x)$ is differentiable, $f(0) = -2$ and $f'(x) \geq 5$. Then the least possible value of $f(2024)$ is

(A) 10,120
(B) 10,118
(C) 10,122
(D) 2024

Answer: (B) 10,118 · The council's preliminary key

Q121 AP EAPCET 2024 · 18 May · Shift 1 MCQ

If $y = \mathrm{Tan}^{-1}\left(\frac{2-3\sin x}{3-2\sin x}\right)$ then $\frac{dy}{dx} =$

(A) $\frac{(3-2\sin x)^2}{13\sin^2 x-24\sin x+13}$
(B) $\frac{-5\cos x}{13\sin^2 x-24\sin x+13}$
(C) $\frac{5\sin x}{13\sin^2 x-24\sin x+13}$
(D) $\frac{-5\sin x}{13\sin^2 x-24\sin x+13}$

Answer: (B) $\frac{-5\cos x}{13\sin^2 x-24\sin x+13}$ · The council's preliminary key

Q122 AP EAPCET 2024 · 18 May · Shift 1 MCQ

If $x = 3\left[\sin t - \log\left(\cot\frac{t}{2}\right)\right]$ and $y = 6\left[\cos t + \log\left(\tan\frac{t}{2}\right)\right]$ then $\frac{dy}{dx} =$

(A) $\frac{2\sin^2 t}{1+\sin t\cos t}$
(B) $\frac{2\cos^2 t}{1+\sin 2t}$
(C) $\frac{2\cos^2 t}{1+\sin t\cos t}$
(D) $\frac{1+\cos 2t}{1+\sin 2t}$

Answer: (C) $\frac{2\cos^2 t}{1+\sin t\cos t}$ · The council's preliminary key

Q123 TS EAPCET 2024 · 11 May · Shift 1 MCQ

If $y = \sqrt{\sin(\log 2x) + \sqrt{\sin(\log 2x) + \sqrt{\sin(\log 2x) + \ldots\infty}}}$, then $\frac{dy}{dx} =$

(A) $\frac{\cos(\log 2x)}{2x(2y-1)}$
(B) $\frac{\cos(\log 2x)}{(2y-1)}$
(C) $\frac{\cos(\log 2x)}{x(2y-1)}$
(D) $\frac{\sin(\log 2x)}{x(2y-1)}$

Answer: (C) $\frac{\cos(\log 2x)}{x(2y-1)}$ · The council's preliminary key

Q124 TS EAPCET 2024 · 11 May · Shift 1 MCQ

If $y = \text{Tan}^{-1}\left[\frac{\sin^3(2x) - 3x^2\sin(2x)}{3x\sin^2(2x) - x^3}\right]$, then $\frac{dy}{dx} =$

(A) $\frac{6x\cos(2x) - 3\sin(2x)}{x^2 - \sin^2(2x)}$
(B) $\frac{6x\sin(2x) - 3\cos(2x)}{x^2 + \sin^2(2x)}$
(C) $\frac{2x\cos(2x) - \sin(2x)}{x^2 + \sin^2(2x)}$
(D) $\frac{6x\cos(2x) - 3\sin(2x)}{x^2 + \sin^2(2x)}$

Answer: (D) $\frac{6x\cos(2x) - 3\sin(2x)}{x^2 + \sin^2(2x)}$ · The council's preliminary key

Q125 TS EAPCET 2024 · 11 May · Shift 1 MCQ

Derivative of $(\sin x)^x$ with respect to $x^{(\sin x)}$ is

(A) $\frac{(\sin x)^{x-1}\left[(\sin x)\log(\sin x) + x\cos x\right]}{x^{(\sin x-1)}\left[x\cos x(\log x) + \sin x\right]}$
(B) $\frac{(\sin x)^{x}\left[(\sin x)(\log(\sin x) + x\cos x)\right]}{x^{(\sin x)}\left[x\cos x(\log x) + \sin x\right]}$
(C) $\frac{x^{\sin x-1}\left[x\cos x(\log x) + \sin x\right]}{(\sin x)^{x-1}\left[(\sin x)\log(\sin x) + x\cos x\right]}$
(D) $\frac{x^{\sin x}\left[x\cos x(\log x) + \sin x\right]}{(\sin x)^{x}\left[(\sin x)\log(\sin x) + x\cos x\right]}$

Answer: (A) $\frac{(\sin x)^{x-1}\left[(\sin x)\log(\sin x) + x\cos x\right]}{x^{(\sin x-1)}\left[x\cos x(\log x) + \sin x\right]}$ · The council's preliminary key

Q126 TS EAPCET 2024 · 11 May · Shift 1 MCQ

$y = 2x^3 - 8x^2 + 10x - 4$ is a function defined on $[1, 2]$. If the tangent drawn at a point (a, b) on the graph of this function is parallel to X-axis and $a \in (1, 2)$, then $a =$

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(A) 0

(B) 5

(C) 1

(D) $\frac{5}{3}$

Answer: (D) $\frac{5}{3}$ · The council's preliminary key

Q127 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If $y = \log\left[\tan\sqrt{\frac{2^x-1}{2^x+1}}\right], x > 0$, then $\left(\frac{dy}{dx}\right)_{x=1} =$

(A) $\frac{4\sqrt{2}\log 2}{9\sin\left(\frac{2}{\sqrt{3}}\right)}$

(B) $\frac{4\sqrt{3}\log 2}{9\sin\left(\frac{\sqrt{3}}{2}\right)}$

(C) $\frac{4\sqrt{3}\log 2}{9\sin\left(\frac{2}{\sqrt{3}}\right)}$

(D) $\frac{4\sqrt{2}\log 2}{9\sin\left(\frac{\sqrt{3}}{2}\right)}$

Answer: (C) $\frac{4\sqrt{3}\log 2}{9\sin\left(\frac{2}{\sqrt{3}}\right)}$ · The council's preliminary key

Q128 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If $y = \cos^{-1}\left(\frac{6x-2x^2-4}{2x^2-6x+5}\right)$ then $\frac{dy}{dx} =$

(A) $\frac{2}{\sqrt{3x-x^2-2}}$

(B) $\frac{2}{3x-x^2-2}$

(C) $\frac{2}{\sqrt{2x^2-6x+5}}$

(D) $\frac{2}{2x^2-6x+5}$

Answer: (D) $\frac{2}{2x^2-6x+5}$ · The council's preliminary key

Q129 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If $\log y = y^{\log x}$ then $\frac{dy}{dx} =$

(A) $\frac{y(\log y)^2}{x(1-\log x \log y)}$
(B) $\frac{x(\log x)^2}{y(1-\log x \log y)}$
(C) $\frac{x(1-\log x \log y)}{y(\log y)^2}$
(D) $\frac{y(1-\log x \log y)}{x(\log x)^2}$

Answer: (A) $\frac{y(\log y)^2}{x(1-\log x \log y)}$ · The council's preliminary key

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Q130 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If $y = a\cos 3x + be^{-x}$, then $y''(3\sin 3x - \cos 3x) =$

(A) $10y' \sin 3x + 3y(\sin 3x + 3\cos 3x)$
(B) $10y' \cos 3x + 3y(\sin 3x + 3\cos 3x)$
(C) $10y' \cos 3x + 3y(\cos 3x + 3\sin 3x)$
(D) $10y' \cos 3x + 3y(\sin 3x - 3\cos 3x)$

Answer: (B) $10y' \cos 3x + 3y(\sin 3x + 3\cos 3x)$ · The council's preliminary key

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Q131 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If the function $f(x) = x^3 + ax^2 + bx + 40$ satisfies the conditions of Rolle's theorem on the interval $[-5, 4]$ and $-5, 4$ are two roots of the equation $f(x) = 0$, then one of the values of c as stated in that theorem is

(A) 3
(B) $\frac{1+\sqrt{67}}{3}$
(C) $\frac{1+\sqrt{65}}{3}$
(D) -2

Answer: (B) $\frac{1+\sqrt{67}}{3}$ · The council's preliminary key

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Q132 TS EAPCET 2024 · 10 May · Shift 2 MCQ

If $y = \log\left(x - \sqrt{x^2-1}\right)$, then $(x^2-1)y'' + xy' + e^y + \sqrt{x^2-1} =$

(A) 0
(B) 1
(C) $\sqrt{x^2-1}$
(D) x

Answer: (D) x · The council's preliminary key

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Q133 TS EAPCET 2024 · 10 May · Shift 2 MCQ

If Rolle's Theorem is applicable for the function $f(x)=\begin{cases} x^p \log x, & x \neq 0 \\ 0, & x=0 \end{cases}$ on the interval $[0,1]$, then a possible value of p is

(A) -2
(B) -1
(C) 0
(D) 1

Answer: (D) 1 · The council's preliminary key

Q134 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If $2x^2-3xy+4y^2+2x-3y+4=0$, then $\left(\frac{dy}{dx}\right)_{(3,2)}=$

(A) -5
(B) $\frac{5}{7}$
(C) -2
(D) $\frac{2}{7}$

Answer: (C) -2 · The council's preliminary key

Q135 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If $x=\frac{9t^2}{1+t^4}$ and $y=\frac{16t^2}{1-t^4}$ then $\frac{dy}{dx}=$

(A) $\frac{16}{9}\left(\frac{1-t^4}{1+t^4}\right)^3$
(B) $\frac{16(1-t^4)}{9(1+t^4)}$
(C) $\frac{9(1-t^4)}{16(1+t^4)}$
(D) $\frac{16}{9}\left(\frac{1+t^4}{1-t^4}\right)^3$

Answer: (D) $\frac{16}{9}\left(\frac{1+t^4}{1-t^4}\right)^3$ · The council's preliminary key

Q136 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If $y=\sin ax+\cos bx$ then $y''+b^2y=$

(A) $(b^2-a^2)\sin ax$
(B) $(b^2-a^2)\cos bx$
(C) $(a^2-b^2)\tan ax$
(D) $(b^2-a^2)\cot bx$

Answer: (A) $(b^2-a^2)\sin ax$ · The council's preliminary key

Q137 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If $f(x)=(2x-1)(3x+2)(4x-3)$ is a real valued function defined on $\left[\frac{1}{2},\frac{3}{4}\right]$, then the value(s) of 'c' as defined in the statement of Rolle's theorem

(A) Does not exist
(B) $\frac{7\pm\sqrt{247}}{36}$
(C) $\frac{7-\sqrt{247}}{36}$
(D) $\frac{7+\sqrt{247}}{36}$

Answer: (D) $\frac{7+\sqrt{247}}{36}$ · The council's preliminary key

Q138 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If $y=\dfrac{\tan x\,\mathrm{Cos}^{-1}x}{\sqrt{1-x^2}}$ then the value of $\dfrac{dy}{dx}$, when $x=0$ is

(A) 0
(B) $\dfrac{\pi}{2}$
(C) 1
(D) $\dfrac{\pi}{6}$

Answer: (B) $\dfrac{\pi}{2}$ · The council's preliminary key

Q139 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If $y(\cos x)^{\sin x}=(\sin x)^{\sin x}$ then the value of $\frac{dy}{dx}$ at $x=\frac{\pi}{4}$ is

(A) 0
(B) 1
(C) $\sqrt{2}$
(D) $\frac{\sqrt{3}}{2}$

Answer: (C) $\sqrt{2}$ · The council's preliminary key

Q140 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If $x=\cos 2t+\log(\tan t)$ and $y=2t+\cot 2t$, then $\dfrac{dy}{dx}=$

(A) $\tan 2t$
(B) $-\mathrm{cosec}\,2t$
(C) $-\cot 2t$
(D) $\sec 2t$

Answer: (B) $-\mathrm{cosec}\,2t$ · The council's preliminary key

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Q141 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If $y = 44x^{45} + 45x^{-44}$, then $y'' =$

(A) $\frac{1980y}{x^2}$
(B) $\frac{2020x^2}{y}$
(C) $\frac{2024y}{x^2}$
(D) $\frac{1990x^2}{y}$

Answer: (A) $\frac{1980y}{x^2}$ · The council's preliminary key

Q142 AP EAPCET 2023 · 19 May · Shift 1 MCQ

At $x = \frac{\pi^2}{4}$, $\frac{d}{dx}\left(\text{Tan}^{-1}(\cos\sqrt{x}) + \text{Sec}^{-1}(e^x)\right) =$

(A) $\frac{1}{\sqrt{e^{\frac{\pi^2}{2}}-1}} - \frac{1}{\pi}$
(B) $\frac{\pi}{4} + \frac{1}{\sqrt{e^{\pi^2}+e^{\pi^2/2}}}$
(C) $\frac{1}{\sqrt{e^{\pi^2}+e^{\pi^2/2}}} + \frac{2}{\pi}\cot\left(\frac{\sqrt{\pi}}{2}\right)$
(D) $\frac{1}{\sqrt{e^{\pi}}} + \frac{1}{\pi}$

Answer: (A) $\frac{1}{\sqrt{e^{\frac{\pi^2}{2}}-1}} - \frac{1}{\pi}$ · The council's preliminary key

Q143 AP EAPCET 2023 · 18 May · Shift 1 MCQ

If $x^3 + y^3 = 3axy$, then at $\left(\frac{3a}{2}, \frac{3a}{2}\right)$ the value of $3ay'' + 40$ is

(A) -5
(B) 0
(C) 8
(D) 1

Answer: (C) 8 · The council's preliminary key

Q144 AP EAPCET 2023 · 18 May · Shift 2 MCQ

$f(x)$ and $g(x)$ are differentiable functions such that $\frac{f(x)}{g(x)} =$ a non zero constant.

If $\frac{f'(x)}{g'(x)} = \alpha(x)$ and $\left(\frac{f(x)}{g(x)}\right)' = \beta(x)$, then $\frac{\alpha(x) - \beta(x)}{\alpha(x) + \beta(x)} =$

(A) 0
(B) $f(x) + g(x)$
(C) 1
(D) $f'(x) + g'(x)$

Answer: (C) 1 · The council's preliminary key

Q145 AP EAPCET 2023 · 18 May · Shift 2 MCQ

$A(-2,9)$ and $B(1,6)$ are two points on the curve $y=x^2+5$. The coordinates of the point C on the curve such that the tangent drawn at A is parallel to the chord BC, is

(A) $(-5,30)$
(B) $(0,5)$
(C) $(-9,86)$
(D) $(6,41)$

Answer: (A) $(-5,30)$ · The council's preliminary key

Q146 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If $f(t)=\frac{t}{2}+\frac{1}{4}\log(2t-1)$, then $f'\left(\frac{t+1}{2t+1}\right)=$

(A) t
(B) $1+t$
(C) $2t+1$
(D) $t-1$

Answer: (B) $1+t$ · The council's preliminary key

Q147 AP EAPCET 2023 · 16 May · Shift 1 MCQ

If $y=x\log\left(\frac{1}{ax}+\frac{1}{a}\right)$, then $x(x+1)\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=$

(A) 0
(B) $1+x$
(C) -1
(D) x

Answer: (C) -1 · The council's preliminary key

Q148 AP EAPCET 2023 · 16 May · Shift 2 MCQ

If $x^2\mathrm{Tan}^{-1}\frac{y}{x}-y^2\mathrm{Tan}^{-1}\frac{x}{y}=k$, then $\left(\frac{dy}{dx}\right)_{(1,1)}=$

(A) 0
(B) $\pi/4$
(C) 1
(D) $\pi/2$

Answer: (C) 1 · The council's preliminary key

Q149 AP EAPCET 2023 · 16 May · Shift 2 MCQ

If $u=\sin\left(\frac{x}{y}\right)$, $x=e^t$ and $y=t^2$, then $t^6\left(\frac{du}{dt}\right)^2\div e^{2t}(t-2)^2=$

(A) $2u$
(B) u^2
(C) $1-u^2$
(D) $\cos u$

Answer: (C) $1-u^2$ · The council's preliminary key

Q150 AP EAPCET 2023 · 16 May · Shift 2 MCQ

If $g(x)$ is the inverse of the function $f(x)$ and $f'(x)=\frac{1}{h(x)}$, then $g'(x)=$

(A) $h(g(x))$
(B) $g(h(x))$
(C) $h'(f(x))$
(D) $f(h(x))$

Answer: (A) $h(g(x))$ · The council's preliminary key

Q151 AP EAPCET 2023 · 15 May · Shift 1 MCQ

If $f(x)$ is a differentiable function, $f'(x)\geq 5\ \forall x\in[2,6]$, $f(2)=4$ and $f(3)=15$, then a possible value of $f(6)$

(A) $=24$
(B) lies between 4 and 15
(C) ≤ 15
(D) $=5$

Answer: (A) $=24$ · The council's preliminary key

Q152 AP EAPCET 2023 · 15 May · Shift 1 MCQ

If $y=\frac{\log x}{x}$, then the value of $x^2\frac{d^2y}{dx^2}+3x\frac{dy}{dx}+y$ at the point $(\sqrt[3]{e},\sqrt{e})$ is

(A) 0
(B) 1
(C) e
(D) $2e$

Answer: (A) 0 · The council's preliminary key

Q153 AP EAPCET 2023 · 15 May · Shift 1 MCQ

Let $f(x)$ be a differentiable function, $A(0,\alpha)$ and $B(8,\beta)$ be two points on the curve $y=f(x)$. Given $f(0)=2$ and $f'(4)=\frac{-3}{4}$. If the chord AB of the curve is parallel to the tangent drawn at the point $(4,f(4))$, then $\beta=$

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(A) -4

(B) -6

(C) 2

(D) 8

Answer: (A) -4 · The council's preliminary key

Q154 AP EAPCET 2023 · 15 May · Shift 2 MCQ

If $x^x y^y = e^e$, then $\left(\frac{d^2y}{dx^2}\right)_{(e,e)} =$

(A) $\frac{1}{e}\left(\frac{dy}{dx}\right)_{(e,e)}$

(B) $\left(\frac{dy}{dx}\right)_{(e,e)} + \frac{1}{e}$

(C) $\left(\frac{dy}{dx}\right)_{(e,e)} - \frac{1}{e}$

(D) $e\left(\frac{dy}{dx}\right)_{(e,e)}$

Answer: (A) $\frac{1}{e}\left(\frac{dy}{dx}\right)_{(e,e)}$ · The council's preliminary key

Q155 AP EAPCET 2023 · 15 May · Shift 2 MCQ

If $f(x+ay) + g(x-ay) = 0$, then $a\frac{dy}{dx} =$

(A) $\frac{f'(x-ay) + g'(x+ay)}{g'(x+ay) - f'(x-ay)}$

(B) $\frac{f'(x+ay) + g'(x-ay)}{g'(x-ay) - f'(x+ay)}$

(C) $\frac{f'(x+ay)g'(x-ay)}{f'(x+ay) + g'(x-ay)}$

(D) $\frac{f'(x+ay) + g'(x-ay)}{f'(x+ay)g'(x-ay)}$

Answer: (B) $\frac{f'(x+ay) + g'(x-ay)}{g'(x-ay) - f'(x+ay)}$ · The council's preliminary key

Q156 TS EAMCET 2023 · 14 May · Shift 1 MCQ

On differentiation if we get $f(x,y)\,dy - g(x,y)\,dx = 0$ from $2x^2 - 3xy + y^2 + x + 2y - 8 = 0$ then $\frac{g(2,2)}{f(1,1)} =$

(A) $\frac{11}{7}$

(B) -3

(C) $\frac{-1}{3}$

(D) 7

Answer: (B) -3 · The council's preliminary key

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Q157 TS EAMCET 2023 · 14 May · Shift 1 MCQ

If $f(x) = e^x$, $h(x) = (f \circ f)(x)$, then $\frac{h'(x)}{h(x)} =$

(A) $h(x)$
(B) $\frac{1}{h(x)}$
(C) $\log h(x)$
(D) $-\log h(x)$

Answer: (C) $\log h(x)$ · The council's preliminary key

Q158 TS EAMCET 2023 · 14 May · Shift 1 MCQ

If $\sin y = \sin 3t$ and $x = \sin t$, then $\frac{dy}{dx} =$

(A) $\frac{3}{\sqrt{4-x^2}}$
(B) $\frac{3}{\sqrt{1-x^2}}$
(C) $\frac{1}{\sqrt{4-x^2}}$
(D) $\frac{-1}{\sqrt{4-x^2}}$

Answer: (B) $\frac{3}{\sqrt{1-x^2}}$ · The council's preliminary key

Q159 TS EAMCET 2023 · 14 May · Shift 2 MCQ

If $f(x) = \sqrt{x}$ $(x \geq 0)$ and $g(x) = 1 + x^2$, then $(fog)'(1) =$

(A) 1
(B) $\frac{1}{2}$
(C) $\sqrt{2}$
(D) $\frac{1}{\sqrt{2}}$

Answer: (D) $\frac{1}{\sqrt{2}}$ · The council's preliminary key

Q160 TS EAMCET 2023 · 14 May · Shift 2 MCQ

Match the values of $\frac{dy}{dx}$ at $x = \frac{\pi}{3}$ for the following system of curves in parametric form given in List-I with those of the items in List-II

List-I	List-II
i) $x = a(\theta - \sin\theta),\ y = a(1 - \cos\theta)$	a) $4\sqrt{3}$
ii) $x = 3\cos\theta - 2\cos^3\theta,\ y = 3\sin\theta - 2\sin^3\theta$	b) $\frac{-1}{3\sqrt{3}}$
iii) $x = 3\cos\theta - \cos^3\theta,\ y = 3\sin\theta - \sin^3\theta$	c) $\sqrt{3}$

iv) $x = a\log\sin\theta,\ y = a\tan\theta$

d) $\frac{1}{\sqrt{3}}$

e) $\frac{1}{3\sqrt{3}}$

(A) $(i) \to c,\ (ii) \to d,\ (iii) \to b,\ (iv) \to a$

(B) $(i) \to c,\ (ii) \to e,\ (iii) \to d,\ (iv) \to a$

(C) $(i) \to d,\ (ii) \to c,\ (iii) \to b,\ (iv) \to a$

(D) $(i) \to d,\ (ii) \to c,\ (iii) \to e,\ (iv) \to b$

Answer: (A) $(i) \to c,\ (ii) \to d,\ (iii) \to b,\ (iv) \to a$ · The council's preliminary key

Q161 TS EAMCET 2023 · 14 May · Shift 2 MCQ

If $y = x\sin x$ and $\frac{\frac{dy}{dx} - \frac{y}{x}}{x\frac{dy}{dx} - y}$ at $x = \alpha$ is 1, then $\alpha =$

(A) $\sqrt{2}$

(B) 2

(C) 1

(D) $\frac{1}{\sqrt{2}}$

Answer: (C) 1 · The council's preliminary key

Q162 TS EAMCET 2023 · 13 May · Shift 1 MCQ

If $f(x) = \frac{e^{2x} - e^{-2x}}{e^{3x} + e^{-3x}}$, then $f'(0) =$

(A) -1

(B) 0

(C) 1

(D) 2

Answer: (D) 2 · The council's preliminary key

Q163 TS EAMCET 2023 · 13 May · Shift 1 MCQ

If $f(x) = x^{\tan x} + (\tan x)^x$, then $f'\left(\frac{\pi}{4}\right) =$

(A) $1 + \frac{\pi}{2}\log\left(\frac{e\pi}{4}\right)$

(B) $\frac{\pi}{2}\left(\log\frac{\pi}{4} + 1\right)$

(C) 1

(D) 0

Answer: (A) $1 + \frac{\pi}{2}\log\left(\frac{e\pi}{4}\right)$ · The council's preliminary key

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Q164 TS EAMCET 2023 · 13 May · Shift 2 MCQ

If $f(x)=\sqrt{\log(x^2+x+1)+\sqrt{\cosh(2x-3)}}$, then $f'(0)=$

(A) $\dfrac{1}{2\sqrt{\sqrt{\cosh(3)}}}\left(1+\dfrac{\sinh(3)}{\sqrt{\cosh(3)}}\right)$

(B) $\dfrac{1}{2\sqrt{\sqrt{\cosh(3)}}}\left(\log 3-\dfrac{\sinh(3)}{\sqrt{\cosh(3)}}\right)$

(C) $\dfrac{\log 3\sqrt{\cosh(3)}-\sinh(3)}{2(\cosh(3))^{\frac{3}{4}}}$

(D) $\dfrac{\sqrt{\cosh(3)}-\sinh(3)}{2(\cosh(3))^{\frac{3}{4}}}$

Answer: (D) $\dfrac{\sqrt{\cosh(3)}-\sinh(3)}{2(\cosh(3))^{\frac{3}{4}}}$ · The council's preliminary key

Q165 TS EAMCET 2023 · 13 May · Shift 2 MCQ

If $x=\cos^3\theta-\sin^3\theta$ and $y=\sqrt[3]{\cos\theta}-\sqrt[3]{\sin\theta}$, then the value of $\frac{dy}{dx}$ at $\theta=\frac{\pi}{4}$ is

(A) $\frac{2}{9}\sqrt[3]{2}$

(B) $\frac{\sqrt[3]{2}}{3}$

(C) $\frac{4}{9}\sqrt[3]{2}$

(D) $\frac{\sqrt[3]{2}}{9}$

Answer: (A) $\frac{2}{9}\sqrt[3]{2}$ · The council's preliminary key

Q166 TS EAMCET 2023 · 13 May · Shift 2 MCQ

If $2x^2+3xy-y^2+4x-5y+6=0$, then the value of $\frac{dy}{dx}$ at $(x,y)=(1,-2)$ is

(A) 1

(B) -1

(C) $\frac{7}{2}$

(D) 0

Answer: (B) -1 · The council's preliminary key

Q167 TS EAMCET 2023 · 12 May · Shift 1 MCQ

If $\tan y=\cot\left(\frac{\pi}{4}-x\right)$ then $\frac{dy}{dx}=$

(A) $\frac{\text{cosec}^2\left(\frac{\pi}{4}-x\right)}{1+\cot^2\left(\frac{\pi}{4}+x\right)}$

(B) $\frac{-\text{cosec}^2\left(\frac{\pi}{4}-x\right)}{\sec^2 y}$

(C) $\frac{\text{cosec}^2\left(\frac{\pi}{4}-x\right)}{1+\tan^2\left(\frac{\pi}{4}-x\right)}$

(D) $\frac{\sec^2\left(\frac{\pi}{4}+x\right)}{1+\tan^2\left(\frac{\pi}{4}+x\right)}$

Answer: (D) $\frac{\sec^2\left(\frac{\pi}{4}+x\right)}{1+\tan^2\left(\frac{\pi}{4}+x\right)}$ · The council's preliminary key

Q168 TS EAMCET 2023 · 12 May · Shift 1 MCQ

If $x = 3\sqrt{2}\cos^3\theta$ and $y = 4\tan^2\theta$ then $\left(\frac{dy}{dx}\right)_{\theta=\pi/4} =$

(A) $\frac{32\sqrt{2}}{9}$

(B) $\frac{16}{9}$

(C) $-\frac{16}{9}$

(D) $-\frac{32}{9}$

Answer: (D) $-\frac{32}{9}$ · The council's preliminary key

Q169 TS EAMCET 2023 · 12 May · Shift 1 MCQ

The derivative of $\frac{1-x^2}{1+x^2}$ with respect to $\frac{2x}{1+x^2}$ at $x = 2$ is

(A) 0

(B) $\frac{4}{3}$

(C) 1

(D) $-\frac{4}{3}$

Answer: (B) $\frac{4}{3}$ · The council's preliminary key

Q170 TS EAMCET 2023 · 12 May · Shift 2 MCQ

If $\sec(\log_2 y^2) = \text{cosec}(\log_2 x^2)$, then $\frac{dy}{dx} =$

(A) $\frac{x}{y}$

(B) $\frac{y}{x}$

(C) $-\frac{y}{x}$

(D) $-\frac{x}{y}$

Answer: (C) $-\frac{y}{x}$ · The council's preliminary key

Q171 TS EAMCET 2023 · 12 May · Shift 2 MCQ

If $e^x = y + \sqrt{y^2-1}$, then $\frac{dy}{dx} =$

(A) $\sinh x$
(B) $\cosh x$
(C) $\tanh x$
(D) $-\sinh x$

Answer: (A) $\sinh x$ · The council's preliminary key

Q172 TS EAMCET 2023 · 12 May · Shift 2 MCQ

If $x = \log p$ and $y = \frac{1}{p}$ then $\frac{dy}{dx} =$

(A) $-e^{-x}$
(B) e^{x}
(C) x
(D) y

Answer: (A) $-e^{-x}$ · Checked by our team

Q173 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

If $f(x) = \dfrac{e^{-x}\sin x}{\log_e x}$ and $f'(x) = f(x) \cdot g(x)$, then $g'(e) =$

(A) $e^{-2} - \operatorname{cosec}^2(e)$
(B) $2e^{2} - \operatorname{cosec}^2(e)$
(C) $2e^{-2} - \operatorname{cosec}^2(e)$
(D) $2e^{-2} + \operatorname{cosec}^2(e)$

Answer: (C) $2e^{-2} - \operatorname{cosec}^2(e)$ · The council's preliminary key

Q174 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

If $y = \dfrac{e^{\sin x} + \sinh^3 x}{\cosh x - \tan x}$, then $y'(0) =$

(A) 0
(B) 1
(C) -1
(D) 2

Answer: (D) 2 · The council's preliminary key

Q175 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

If $f(x) = \sum_{p=1}^{7} p^2 \operatorname{Sin}^{-1}\left(\frac{4}{5}\sin(px) - \frac{3}{5}\cos(px)\right)$ then the value of $\frac{df}{dx}$ at $x = 1$ is (Given that $\operatorname{Sin}^{-1}(\sin x) = x$)

(A) 0
(B) 628
(C) 1140
(D) 784

Answer: (D) 784 · The council's preliminary key

Q176 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

If $y = \frac{ax+b}{cx+d}$, then $\frac{dx}{dy} =$

(A) $\frac{ad-bc}{(ax+b)^2}$
(B) $\frac{ad-bc}{(a-cy)^2}$
(C) $\frac{ad+bc}{(cx+d)^2}$
(D) $\frac{ad+bc}{(a+cy)^2}$

Answer: (B) $\frac{ad-bc}{(a-cy)^2}$ · The council's preliminary key

Q177 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

If $x^2+y^2 = t+\frac{1}{t}$, $x^4+y^4 = t^2+\frac{1}{t^2}$ then $\frac{dy}{dx} =$

(A) $\frac{x}{y}$
(B) $\frac{-x}{y}$
(C) $\frac{y}{x}$
(D) $\frac{-y}{x}$

Answer: (D) $\frac{-y}{x}$ · The council's preliminary key

Q178 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

If $x\cos(k+y) = \cos y$ then $\frac{dy}{dx}$ at $y = \frac{\pi}{2}$ is

(A) $\sin k$
(B) $\cos k$
(C) 1
(D) 0

Answer: (A) $\sin k$ · The council's preliminary key

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Q179 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

If $x = a(\cos\theta + \theta\sin\theta)$, $y = f(\theta)$, $f(2\pi) = 0$, $\frac{dy}{dx} = \frac{\tan\theta}{\theta}$, $\theta \neq 0$ and $\theta \neq (2n+1)\frac{\pi}{2}$, then $f\left(\frac{\pi}{3}\right) =$

(A) $2a\pi$
(B) $\frac{\pi}{2}a$
(C) $\frac{a}{2}$
(D) $-2a$

Answer: (C) $\frac{a}{2}$ · The council's preliminary key

Q180 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

$\frac{d}{dx}\left[\left(x^{5/2} - x^{3/2} + 1\right)\left(x^2 - 3x + 5\right)\right] =$

(A) $\frac{9}{2}x^{7/2} - 14x^{5/2} + 20x^{3/2} - \frac{15}{2}x^{1/2} + 2x - 3$
(B) $\frac{9}{2}x^{7/2} - 7x^{5/2} + 5x^{3/2} - \frac{3}{2}x^{1/2} + 2x - 3$
(C) $9x^{7/2} - 14x^{5/2} + 20x^{3/2} - 15x^{1/2} + 2x - 3$
(D) $\frac{9}{2}x^{7/2} - \frac{7}{2}x^{5/2} + \frac{5}{2}x^{3/2} - \frac{15}{2}x^{1/2} + 2x - 3$

Answer: (A) $\frac{9}{2}x^{7/2} - 14x^{5/2} + 20x^{3/2} - \frac{15}{2}x^{1/2} + 2x - 3$ · The council's preliminary key

Q181 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

The value of $\frac{d}{dx}\left[\log\left(\sin\sqrt{\frac{x^2+1}{x^2+2}}\right)\right]$ when $x = \sqrt{2}$, is

(A) $\frac{\sqrt{2}\cot\left(\frac{\sqrt{3}}{2}\right)}{6\sqrt{3}}$
(B) $\frac{\sqrt{2}\tan\left(\frac{\sqrt{3}}{2}\right)}{6\sqrt{3}}$
(C) $\frac{\sqrt{2}\cot\left(\frac{\sqrt{3}}{2}\right)}{8\sqrt{3}}$
(D) $\frac{\sqrt{2}\tan\left(\frac{\sqrt{3}}{2}\right)}{8\sqrt{3}}$

Answer: (C) $\frac{\sqrt{2}\cot\left(\frac{\sqrt{3}}{2}\right)}{8\sqrt{3}}$ · The council's preliminary key

Q182 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

If $f(x) = \frac{1+\sec x}{2(\sec x - 1)}$ for $0 < x < \frac{\pi}{2}$ and $f'(x) = f(x)\cdot g(x)$, then $g(x) =$

(A) $\operatorname{cosec} x$
(B) $-\operatorname{cosec} x$
(C) $2\operatorname{cosec} x$
(D) $-2\operatorname{cosec} x$

Answer: (D) $-2\operatorname{cosec} x$ · The council's preliminary key

Q183 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

If $f(x)=\log_e\left(e^{2x}\left(\frac{3x+5}{5-3x}\right)^{2/3}\right),\ x\neq\frac{-5}{3},\frac{5}{3}$, then the value of $\frac{df}{dx}$ at $x=1$, is

(A) $\frac{5}{4}$
(B) $\frac{7}{4}$
(C) $\frac{11}{4}$
(D) $\frac{13}{4}$

Answer: (D) $\frac{13}{4}$ · The council's preliminary key

Q184 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

If $x=\operatorname{cosec}\theta-\sin\theta,\ y=\operatorname{cosec}^{2022}\theta-\sin^{2022}\theta$ and $\left(\frac{dy}{dx}\right)^2=\frac{k(y^2+4)}{g(x)}$ where $k\in\mathbb{R}$, then $10+k-g(2022)=$

(A) 0
(B) 6
(C) 10
(D) 14

Answer: (B) 6 · The council's preliminary key

Q185 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

If $f(x)=\sin\left(\cosh\left(\frac{x^2+1}{x^2+2}\right)\right)$ then $f'(1)=$

(A) $\frac{2}{9}\sinh\left(\frac{2}{3}\right)\cos\left(\cosh\left(\frac{2}{3}\right)\right)$
(B) $\sinh\left(\frac{2}{3}\right)\cos\left(\cosh\left(\frac{2}{3}\right)\right)$
(C) $\frac{2}{9}\cos\left(\cosh\left(\frac{2}{3}\right)\right)$
(D) $\frac{2}{9}\cosh\left(\frac{2}{3}\right)\cos\left(\sinh\left(\frac{2}{3}\right)\right)$

Answer: (A) $\frac{2}{9}\sinh\left(\frac{2}{3}\right)\cos\left(\cosh\left(\frac{2}{3}\right)\right)$ · The council's preliminary key

Q186 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

If $y=\frac{ax+b}{cx+d}$ and $\frac{dx}{dy}=\frac{ad-bc}{Py^2+Qy+R}$ then $P+Q+R=$

(A) $(a+c)^2$
(B) $(a-c)^2$
(C) $\frac{ad-bc}{a^2+c^2-2ac}$
(D) $\frac{1}{(a-c)^2}$

Answer: (B) $(a-c)^2$ · The council's preliminary key

Q187 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

If $x = a\cos^3\theta$, $y = a\sin^3\theta$, then $\frac{d^2y}{dx^2}$ at $\theta = \pi/4$ is

(A) $\frac{4\sqrt{2}}{3a}$
(B) $\frac{2}{3a}$
(C) $\frac{2\sqrt{2}}{3a}$
(D) $\frac{7\sqrt{2}}{3a}$

Answer: (A) $\frac{4\sqrt{2}}{3a}$ · The council's preliminary key

Q188 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

If $y = \sin\left(2\tan^{-1}\left(\sqrt{\frac{1-x}{1+x}}\right)\right)$, $x = \cos 2\theta$, then $\frac{dy}{dx} =$

(A) $\frac{x}{\sqrt{1-x^2}}$
(B) $-\cot 2\theta$
(C) $\tan 2\theta$
(D) $\frac{-x}{2\sqrt{1-x^2}}$

Answer: (B) $-\cot 2\theta$ · The council's preliminary key

Q189 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

If $y = \frac{\log x}{x}$, then $\frac{d^2y}{dx^2}$ at $x = 1$

(A) $-e^{-3}$
(B) -3
(C) 3
(D) e^3

Answer: (B) -3 · The council's preliminary key

Q190 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

$\frac{d}{dx}\left(\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3e^x}\right) = f(x)\left[\frac{2}{x+1} + \frac{1}{2(x-1)} - \frac{3}{x+4} - 1\right]$, then $f(5) =$

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(A) $\frac{72}{81}e^5$
(B) $\frac{7}{81e^5}$
(C) $\frac{8}{81e^5}$
(D) e^5

Answer: (C) $\frac{8}{81e^5}$ · The council's preliminary key

Q191 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

If $y = \tan(3\tan^{-1}x)$, then $(1-3x^2)\frac{d^2y}{dx^2} - 12x\frac{dy}{dx} =$

(A) $6(x+y)$
(B) $6(y-x)$
(C) $6y$
(D) $-6x$

Answer: (B) $6(y-x)$ · The council's preliminary key

Q192 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

If $\frac{d}{dx}\left(\frac{x^2+1}{(x^2+5)(x^2+9)}\right) = \frac{2x(x^2+1)}{(x^2+5)(x^2+9)}\left[\frac{1}{f(x)} - \frac{1}{g(x)} - \frac{1}{h(x)}\right]$, then $2h(x) - f(x) - g(x) =$

(A) 12
(B) 16
(C) 18
(D) 20

Answer: (A) 12 · The council's preliminary key

Q193 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

If $\frac{y}{x}\cos^4\alpha + \frac{x}{y}\sin^4\alpha = 2\sin^2\alpha.\cos^2\alpha$, then $\frac{dy}{dx} =$

(A) $\sin^3\alpha\cos\alpha$
(B) $\sin^2\alpha\cos^2\alpha$
(C) $\frac{\sin^2\alpha}{\cos^2\alpha}$
(D) $\sin\alpha\cos^3\alpha$

Answer: (C) $\frac{\sin^2\alpha}{\cos^2\alpha}$ · The council's preliminary key

Q194 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

If $x\sin(\alpha+y) = \sin y$ and $\frac{dy}{dx} = \frac{m}{x^2+2nx+1}$, then $m^2 =$

(A) $1-n^2$

(B) $1+n$

(C) $1-n$

(D) n^2-1

Answer: (A) $1-n^2$ · The council's preliminary key

Q195 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

If $3f(\cos x)+2f(\sin x)=5x$, then $f'(\cos x)+f'(\sin x)=$

(A) $-5(\sin x+\cos x)$

(B) $-5\sin x\cos x$

(C) $\frac{-5}{\sin x}-\frac{5}{\cos x}$

(D) $\frac{5}{\sin x}+\frac{5}{\cos x}$

Answer: (C) $\frac{-5}{\sin x}-\frac{5}{\cos x}$ · The council's preliminary key

Q196 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

Assertion (A): $\frac{d}{dx}\left(\frac{x^2\sin x}{\log x}\right)=\frac{x^2\sin x}{\log x}\left(\cot x+\frac{2}{x}-\frac{1}{x\log x}\right)$

Reason (R): $\frac{d}{dx}\left(\frac{uv}{w}\right)=\frac{uv}{w}\left[\frac{u^1}{u}+\frac{v^1}{v}-\frac{w^1}{w}\right]$

(A) A is true, R is true and R is correct explanation of A

(B) A is true, R is true and R is not correct explanation of A

(C) A is true, R is not correct

(D) A is not correct, R is correct

Answer: (A) A is true, R is true and R is correct explanation of A · The council's preliminary key

Q197 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

If $x=f(\theta)$ and $y=g(\theta)$, then $\frac{d^2y}{dx^2}=$

(A) $g''(\theta)/f'(\theta)$

(B) $f''(\theta)/x(\theta)$

(C) $\frac{f'(\theta)g''(\theta)-g'(\theta)f''(\theta)}{(f'(\theta))^3}$

(D) $\frac{g'(\theta)f''(\theta)-g''(\theta)f''(\theta)}{(g''(\theta))^3}$

Answer: (C) $\frac{f'(\theta)g''(\theta)-g'(\theta)f''(\theta)}{(f'(\theta))^3}$ · The council's preliminary key

Q198 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

$f:\mathbf{R}\to\mathbf{R}$ is a function such that $|f(x)-f(y)|\le\frac{1}{2}|x-y|\ \forall x,y\in R$ and $f'(x)\ge\frac{1}{2}\ \forall x\in R$, $f(1)=\frac{1}{2}$. Then the number of points of intersection of curve $y=f(x)$ and the curve $y=x^2-2x-5$ is

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(A) 1
(B) 0
(C) 2
(D) infinite

Answer: (C) 2 · The council's preliminary key

Q199 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

If $\frac{d^n y}{dx^n} = y_n$ and $y = e^{\sqrt{x}} + e^{-\sqrt{x}}$, then $4xy_2 + 2y_1 =$

(A) $-y$
(B) y
(C) $2y$
(D) $-2y$

Answer: (B) y · The council's preliminary key

Q200 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If $f(x) = \cot^{-1}\left(\frac{x^x - x^{-x}}{2}\right)$, then $f'(1) =$

(A) 1
(B) -1
(C) 2
(D) -2

Answer: (B) -1 · The council's preliminary key

Q201 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If $x^3 - 2x^2y^2 + 5x + y - 5 = 0$, then at (1,1) $y''(1) =$

(A) $\frac{-197}{27}$
(B) $\frac{125}{31}$
(C) 12
(D) $\frac{-238}{27}$

Answer: (D) $\frac{-238}{27}$ · The council's preliminary key

Q202 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

If $y^{y^{y^{\cdot^{\cdot^{\cdot^{\infty}}}}}} = \log\{x + \log\{x + \cdots\cdots\}\}$, then $\frac{dy}{dx}$ at $x = e^2 - 2,\ y = \sqrt{2}$ equals _____

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(A) $\frac{\log 2}{2\sqrt{2}(e^2-1)}$
(B) $\frac{1-\log 2}{2\sqrt{2}(e^2-1)}$
(C) $\frac{\sqrt{2}(1-\log 2)}{e^2-1}$
(D) $\frac{\log 2}{\sqrt{2}(e^2-1)}$

Answer: (B) $\frac{1-\log 2}{2\sqrt{2}(e^2-1)}$ · The council's preliminary key

Q203 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

Let 'f' be a twice differentiable function such that $f''(x) = -f(x)$ and $f'(x) = g(x)$. If $h(x) = \{f(x)\}^2 + \{g(x)\}^2$ and $h(5) = 11$, then $h(10) =$ _____

(A) 22
(B) 11
(C) 1
(D) 2

Answer: (B) 11 · The council's preliminary key

Q204 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

The constant 'c' of Lagrange's theorem for $f(x) = (x-1)(x-2)(x-3)$ in $[0,4]$ is _____

(A) $1 \pm \frac{2}{\sqrt{3}}$
(B) $2 \pm \frac{2}{\sqrt{3}}$
(C) $3 \pm \frac{2}{\sqrt{3}}$
(D) $4 \pm \frac{2}{\sqrt{3}}$

Answer: (B) $2 \pm \frac{2}{\sqrt{3}}$ · The council's preliminary key

Q205 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

If $y = \cos(x^\circ)$, $z = \cos x$ then $\frac{dy}{dz} =$

(A) $\frac{-\pi}{180}\sin(x^\circ)\operatorname{cosec} x$
(B) $\sin(x^\circ)\operatorname{cosec} x$
(C) $\frac{\pi}{180}\sin(x^\circ)\operatorname{cosec} x$
(D) $\frac{\pi}{180}\cos(x^\circ)\cos x$

Answer: (C) $\frac{\pi}{180}\sin(x^\circ)\operatorname{cosec} x$ · The council's preliminary key

Q206 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

If $y = \text{Cos}^{-1}(\cos x)$ then find $\frac{dy}{dx}$ at $x = \frac{5\pi}{4}$

(A) 1
(B) -1
(C) 0
(D) $\frac{1}{\sqrt{2}}$

Answer: (B) -1 · The council's preliminary key

Q207 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

If $y = \text{Sin}^{-1}\left[x\sqrt{1-x} - \sqrt{x}\cdot\sqrt{1-x^2}\right]$ and $0 < x < 1$, then $\frac{dy}{dx}$ is equal to

(A) $\frac{1}{2\sqrt{1-x^2}} - \frac{1}{x\sqrt{1-x^2}}$
(B) $\frac{1}{\sqrt{1-x^2}} - \frac{1}{2\sqrt{x-x^2}}$
(C) $\frac{1}{2\sqrt{x-x^2}} + \frac{1}{\sqrt{1-x^2}}$
(D) $\frac{-1}{\sqrt{1-x^2}} - \frac{1}{x\sqrt{1-x^2}}$

Answer: (B) $\frac{1}{\sqrt{1-x^2}} - \frac{1}{2\sqrt{x-x^2}}$ · The council's preliminary key

Q208 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

If $y = \sqrt{x+\sqrt{x+\sqrt{x+\cdots\cdots\infty}}}$, then $\frac{dy}{dx} =$

(A) $\frac{1}{y}$
(B) $\frac{1}{x}$
(C) $\frac{1}{2x-1}$
(D) $\frac{1}{2y-1}$

Answer: (D) $\frac{1}{2y-1}$ · The council's preliminary key

Q209 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

If $p(x)$ is a polynomial of degree 3 which satisfies $p''(1) = 0$ and $p'''(1) = 6$, then $p''(0) =$ ___

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(A) 6
(B) -6
(C) 0
(D) 3

Answer: (B) -6 · The council's preliminary key

Q210 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

Find the value of 'k' if $\frac{d}{dx}\left\{\frac{2}{\sqrt{2+\sqrt{2+\sqrt{2+2\cos(4x)}}}}\right\} = k\sec\left(\frac{x}{2}\right)\tan\left(\frac{x}{2}\right)$

(A) $\frac{1}{2}$
(B) 2
(C) 1
(D) $\frac{1}{8}$

Answer: (A) $\frac{1}{2}$ · The council's preliminary key

Q211 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

If $f'(x) = \sqrt{2x^2-1}$ and $y = f(x^3)$, then find the value of $\frac{dy}{dx}$ at $x = 1$.

(A) -1
(B) 3
(C) 0
(D) -3

Answer: (B) 3 · The council's preliminary key

Q212 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

If $f(x) = x^{\alpha}\log x$ and $f(0) = 0$, then the value of 'α' for which Rolle's theorem can be applied in $[0, 1]$ is _____

(A) -2
(B) -1
(C) 0
(D) $\frac{1}{2}$

Answer: (D) $\frac{1}{2}$ · The council's preliminary key

Q213 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

If $\vec{a} = t^2\hat{i} + e^t\hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + t^2\hat{j} + \log t\,\hat{k}$ and $f(t) = \vec{a} \cdot \vec{b}$, then $f'(1) =$

(A) $3 + 5e$
(B) $5 + 3e$
(C) $3 + 3e$
(D) $4 + 3e$

Answer: (B) $5 + 3e$ · The council's preliminary key

Q214 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

If $y = \text{Tan}^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}$, then the values of $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ respectively are _____

(A) $1,\ 0$
(B) $\frac{x}{2},\ \frac{1}{2}$
(C) $\frac{1}{2},\ 0$
(D) $\frac{-1}{2},\ 0$

Answer: (C) $\frac{1}{2},\ 0$ · The council's preliminary key

Q215 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

If $y = (\tan x)^{\sin x}$, then $\frac{dy}{dx} =$

(A) $(\tan x)^{\sin x}\{\sec x + (\cos x)(\log(\tan x))\}$
(B) $(\sin x)^{\tan x}\{\sec x + (\cos x)(\log(\tan x))\}$
(C) $(\tan x)^{\sin x}\{\sec x - (\cos x)(\log(\tan x))\}$
(D) $(\sin x)^{\tan x}\{\sec x - (\cos x)(\log(\tan x))\}$

Answer: (A) $(\tan x)^{\sin x}\{\sec x + (\cos x)(\log(\tan x))\}$ · The council's preliminary key

Q216 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

If $y = \text{Cos}^{-1}\left\{\frac{a\cos x - b\sin x}{\sqrt{a^2+b^2}}\right\}$, then $\frac{d^2y}{dx^2} =$

(A) $a - b$
(B) $a + b$
(C) 1
(D) 0

Answer: (D) 0 · The council's preliminary key

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Q217 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

The derivative of $\text{Sec}^{-1}\left(\frac{1}{2x^2-1}\right)$ with respect to $\sqrt{1-x^2}$ at $x=\frac{1}{2}$ equals _____

(A) 2
(B) $\frac{1}{2}$
(C) $\frac{1}{4}$
(D) 4

Answer: (D) 4 · The council's preliminary key

Q218 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

The value of 'c', of the Lagrange's mean value theorem, for $f(x)=\sqrt{x^2-x}$, $x\in[1,4]$ is _____

(A) $\frac{4}{3}$
(B) $\frac{3}{2}$
(C) $\frac{5}{4}$
(D) 3

Answer: (B) $\frac{3}{2}$ · The council's preliminary key

Q219 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

If $y=\text{Tan}^{-1}\left(\frac{a\cos x-b\sin x}{b\cos x+a\sin x}\right)$, then $\frac{dy}{dx}=$ _____

(A) 0
(B) $\frac{a}{b}$
(C) -1
(D) 2

Answer: (C) -1 · The council's preliminary key

Q220 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

If $8f(x)+6f\left(\frac{1}{x}\right)=x+5$ and $y=x^2f(x)$, then $\frac{dy}{dx}$ at $x=-1$ equals _____

(A) 0
(B) $\frac{1}{14}$
(C) $\frac{-1}{14}$
(D) 1

Answer: (C) $\frac{-1}{14}$ · The council's preliminary key

Q221 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

If $y = \log\left(\frac{1+x}{1-x}\right)^{1/4} - \frac{1}{2}\mathrm{Tan}^{-1}(x)$, then $\frac{dy}{dx}$ at $x = \frac{1}{\sqrt{2}}$ equals _____

(A) $\frac{-4}{3}$
(B) $\frac{4}{3}$
(C) $\frac{-2}{3}$
(D) $\frac{2}{3}$

Answer: (D) $\frac{2}{3}$ · The council's preliminary key

Q222 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

If $f(x) = \sin x \cdot \sin 2x \cdot \sin 3x$ and $f''(x) = a(\sin bx) + c(\sin dx) + e(\sin kx)$, then the value of $(a + c + e) - (b + d + k)$ equals _____

(A) 8
(B) -8
(C) 16
(D) 12

Answer: (B) -8 · The council's preliminary key

Q223 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If $y = \log_y x$, then $\frac{dy}{dx} =$ _____

(A) $\frac{1}{x \log y}$
(B) $\frac{\log y}{x(1 + \log y)}$
(C) $\frac{1}{x(1 + \log y)}$
(D) $\frac{1}{1 + \log y}$

Answer: (C) $\frac{1}{x(1 + \log y)}$ · The council's preliminary key

Q224 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If $x = a[\cos\theta + \log(\tan(\theta/2))]$ and $y = a\sin\theta$, then $\frac{dy}{dx} =$ _____

(A) $\cot\theta$
(B) $\tan\theta$
(C) $\sin\theta$
(D) $\cos\theta$

Answer: (B) $\tan\theta$ · The council's preliminary key

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Q225 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If $y = 4\cos^3(t)$ and $x = 4\sin^3(t)$, then $\frac{dy}{dx} =$

(A) $-\tan(t)$
(B) $\tan(t)$
(C) $-\cot(t)$
(D) $\cot(t)$

Answer: (C) $-\cot(t)$ · The council's preliminary key

Q226 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If $f(x) = \log_{x^2}(\log x)$, then $f'(x)$ at $x = e$ is _____

(A) 0
(B) 1
(C) e^{-1}
(D) $(2e)^{-1}$

Answer: (D) $(2e)^{-1}$ · The council's preliminary key

Q227 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If the function $f(x) = ax^3 + bx^2 + 26x - 24$ satisfies the conditions of Rolle's theorem in $[2, 4]$ and $f'\left(3 + \frac{1}{\sqrt{3}}\right) = 0$, then the value of $ab =$

(A) -9
(B) 9
(C) -3
(D) 3

Answer: (A) -9 · The council's preliminary key

Q228 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

If $f(x) = 2x^2 + 3x - 5$, then the value of $f'(0) + 3f'(-1)$ is equal to _____

(A) 1
(B) 0
(C) 3
(D) 2

Answer: (B) 0 · The council's preliminary key

Q229 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

If $y=\left(1+\frac{1}{x}\right)\left(1+\frac{2}{x}\right)\left(1+\frac{3}{x}\right)\cdots\cdots\left(1+\frac{n}{x}\right)$ and $x\neq 0$. When $x=-1$, $\frac{dy}{dx}=$ _____

(A) $n!$

(B) $(n-1)!$

(C) $(-1)^n(n-1)!$

(D) $(-1)^n n!$

Answer: (C) $(-1)^n(n-1)!$ · The council's preliminary key

Q230 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

$\frac{d}{dx}\left\{\sin^2\left(\text{Cot}^{-1}\sqrt{\frac{1+x}{1-x}}\right)\right\}=$

(A) 0

(B) $\frac{1}{2}$

(C) $\frac{-1}{2}$

(D) -1

Answer: (C) $\frac{-1}{2}$ · The council's preliminary key

Q231 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

If $y=\text{Tan}^{-1}\left\{\frac{ax-b}{bx+a}\right\}$, then $y'=$ _____

(A) $\frac{1}{1+x^2}+\frac{a^2}{a^2+b^2}$

(B) $\frac{1}{1+x^2}$

(C) $\frac{1}{1+\left(\frac{ax-b}{bx+a}\right)^2}$

(D) $\frac{bx+a}{1+(ax-b)^2}$

Answer: (B) $\frac{1}{1+x^2}$ · The council's preliminary key

Q232 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If $x=\sec\theta-\cos\theta$ and $y=\sec^n\theta-\cos^n\theta$, then $(x^2+4)\left(\frac{dy}{dx}\right)^2=$ _____

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(A) $n(y+4)$
(B) $n^2(y^2+4)$
(C) $n(y+2)$
(D) $n^2(y^2+2)$

Answer: (B) $n^2(y^2+4)$ · The council's preliminary key

Q233 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If $y = \log_{\cot x} \tan x - \log_{\tan x} \cot x + \text{Tan}^{-1}\left(\frac{4x}{4-x^2}\right)$, then $\frac{dy}{dx} =$

(A) $\frac{1}{4+x^2}$
(B) $\frac{4}{4+x^2}$
(C) $\frac{1}{4-x^2}$
(D) $\frac{4}{4-x^2}$

Answer: (B) $\frac{4}{4+x^2}$ · The council's preliminary key

Q234 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If $y = \sin(\sin x)$ and $y'' + f(x)\cdot y' + g(x)\cdot y = 0$, then $f(x)\cdot g(x) =$

(A) $\frac{1}{2}\sin(2x)$
(B) $\frac{1}{2}\cos(2x)$
(C) $\sin(2x)$
(D) $\cos(2x)$

Answer: (A) $\frac{1}{2}\sin(2x)$ · The council's preliminary key

Q235 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

If $y = x + \frac{1}{x}$, then which among the following holds?

(A) $x^2y' + xy = 0$
(B) $x^2y' + xy + 2 = 0$
(C) $x^2y' - xy + 2 = 0$
(D) $x^2y' + xy - 2 = 0$

Answer: (C) $x^2y' - xy + 2 = 0$ · The council's preliminary key

Q236 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

If $y = \text{Tan}^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$, where $x^2 \le 1$. Then find $\frac{dy}{dx}$

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(A) $\frac{\pi}{4}+\frac{1}{2}\text{Cos}^{-1}(x^2)$
(B) $\frac{\pi}{4}-\frac{1}{2}\text{Cos}^{-1}(x^2)$
(C) $\frac{-x}{\sqrt{1-x^4}}$
(D) $\frac{-2x}{\sqrt{1-x^4}}$

Answer: (C) $\frac{-x}{\sqrt{1-x^4}}$ · The council's preliminary key

Q237 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

If $3\sin xy+4\cos xy=5$, then $\frac{dy}{dx}$ is equal to _____

(A) $\frac{3\sin xy+4\cos xy}{3\cos xy-4\sin xy}$
(B) $\frac{3\cos xy+4\sin xy}{4\cos xy-3\sin xy}$
(C) $\frac{-y}{x}$
(D) $\frac{x}{y}$

Answer: (C) $\frac{-y}{x}$ · The council's preliminary key

Q238 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

$f(x)=\sqrt{x^2+1};\ g(x)=\frac{x+1}{x^2+1};\ h(x)=2x-3$. Then the value of $f'[h'(g'(x))]=$

(A) $\sqrt{5}$
(B) $\frac{2}{\sqrt{5}}$
(C) $\frac{\sqrt{5}}{2}$
(D) $\frac{1}{\sqrt{5}}$

Answer: (B) $\frac{2}{\sqrt{5}}$ · The council's preliminary key

Q239 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

If $\log(\sqrt{1+x^2}-x)=y(\sqrt{1+x^2})$, then $(1+x^2)\frac{dy}{dx}+xy=$

(A) 0
(B) 1
(C) 2
(D) -1

Answer: (D) -1 · The council's preliminary key

Q240 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

If $y = e^{x^2+e^{x^2+e^{x^2+\cdots}}}$ then $\frac{dy}{dx} =$

(A) $\frac{2x}{1-y}$
(B) $\frac{2xy}{y-1}$
(C) $\frac{2xy}{1-y}$
(D) $\frac{2y}{y-1}$

Answer: (C) $\frac{2xy}{1-y}$ · The council's preliminary key

Q241 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

$\frac{d}{dx}\left(\text{Tan}^{-1}\left(\frac{\cos x}{1+\sin x}\right)\right) =$

(A) $\frac{1}{2}$
(B) $\frac{-1}{2}$
(C) 1
(D) -1

Answer: (B) $\frac{-1}{2}$ · The council's preliminary key

Q242 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

Let f and g be two differentiable functions satisfying $g'(5) = \frac{3}{4}$, $g(5) = 6$ and $g = f^{-1}$. Then $f'(6) =$

(A) $\frac{1}{2}$
(B) $\frac{1}{6}$
(C) $\frac{2}{3}$
(D) $\frac{4}{3}$

Answer: (D) $\frac{4}{3}$ · The council's preliminary key

Q243 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

If $y = x + \tan x$, then $\cos^2 x \frac{d^2y}{dx^2} + 2x =$

(A) $-2y$
(B) $\frac{2}{3}y$
(C) $3y$
(D) $2y$

Answer: (D) $2y$ · The council's preliminary key

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Q244 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

$f:[2,10]\to\mathbb{R}$ is defined as $f(x)=\begin{cases}\frac{1}{2}(x-6)^2-3, & x\le 4\\ x-5, & x>4\end{cases}$. Which of the following is true?

(A) $f(2)\neq f(10)$

(B) $f(x)$ is not continuous on $[2,10]$

(C) Rolle's theorem is not applicable for $f(x)$ in $[2,10]$

(D) Rolle's theorem is applicable for $f(x)$ in $[2,10]$ and Rolle's point $c=6$

Answer: (C) Rolle's theorem is not applicable for $f(x)$ in $[2,10]$ · The council's preliminary key

Q245 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

If $y=\tan(\text{Cos}^{-1}x)$, then $\frac{dy}{dx}=$

(A) $\frac{-x^2}{\sqrt{1-x^2}}$

(B) $\frac{-1}{\sqrt{1-x^2}}$

(C) $\frac{-1}{x\sqrt{1-x^2}}$

(D) $\frac{-1}{x^2\sqrt{1-x^2}}$

Answer: (D) $\frac{-1}{x^2\sqrt{1-x^2}}$ · The council's preliminary key

Q246 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

If $y=\frac{1}{x}+\cos 2x$, then $\frac{d^2y}{dx^2}=$

(A) $\frac{2}{x^3}+4y-\frac{4}{x}$

(B) $4y-\frac{4}{x}-\frac{2}{x^3}$

(C) $\frac{2}{x^3}+\frac{4}{x}-4y$

(D) $4y-\frac{4}{x}-\frac{1}{x^3}$

Answer: (C) $\frac{2}{x^3}+\frac{4}{x}-4y$ · The council's preliminary key

Q247 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

$\frac{d}{dt}\left(\tan t+t^2\,\text{cosec}\,ht\right)$

(A) $\sec^2 t+2t\cot ht-t^2\,\text{cosec}\,ht\cot ht$

(B) $\sec^2 t+2t\,\text{cosec}\,ht-t^2\,\text{cosec}\,ht\cot ht$

(C) $\sec t+2t\cot ht-t^2\,\text{cosec}\,ht\cot ht$

(D) $\sec^2 t+2t\,\text{cosec}\,ht+t^2\,\text{cosec}\,ht\cot ht$

Answer: (B) $\sec^2 t+2t\,\text{cosec}\,ht-t^2\,\text{cosec}\,ht\cot ht$ · The council's preliminary key

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Q248 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

$f:[1,3]\to\mathbb{R}$ is a function defined as $f(x)=x^3+ax^2+bx$. If $f(1)-f(3)=0$ and $f'\left(\frac{2\sqrt{3}+1}{\sqrt{3}}\right)=0$. Then, $a-b=$

(A) 5
(B) -17
(C) $4\sqrt{3}$
(D) $-2\sqrt{3}$

Answer: (B) -17 · The council's preliminary key

Q249 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

If $xe^{xy}=y+\sin^2 x$, then $\frac{dy}{dx}$ at $x=0$ is

(A) 0
(B) -1
(C) -2
(D) 1

Answer: (D) 1 · The council's preliminary key

Q250 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The derivate (sic) of $(\log x)^{\sin x}$ with respect to $\cos x$ at $x=\frac{\pi}{2}$ is

(A) $\frac{-4}{\pi}$
(B) $\frac{-\pi}{2}$
(C) $\frac{-2}{\pi}$
(D) $\frac{-\pi}{4}$

Answer: (C) $\frac{-2}{\pi}$ · The council's preliminary key

Q251 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The Rolle's theorem is not applicable to $f(x)=\begin{cases}x, & 0\le x\le 1\\ 2-x, & 1\le x\le 2\end{cases}$ on $[0,2]$ because

(A) $f(x)$ is not defined everywhere
(B) $f(x)$ is not continuous
(C) $f(0)\neq f(2)$
(D) $f(x)$ is not differentiable

Answer: (D) $f(x)$ is not differentiable · The council's preliminary key

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Q252 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If $f(x) = -(\sin^2 x + \cos^5 x)$, then $\lim_{x\to 0} \frac{1}{x} f'(x)$

(A) exist and is equal to 0

(B) exist and is equal to 7

(C) exist and is equal to 3

(D) does not exist

Answer: (C) exist and is equal to 3 · The council's preliminary key

Q253 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If $x = a(t - \sin t)$ and $y = a(1 - \cos t)$ then $\frac{d^2y}{dx^2} =$

(A) $\frac{1}{4a\sin^4\left(\frac{t}{2}\right)}$

(B) $\frac{-1}{4a\sin^4\left(\frac{t}{2}\right)}$

(C) $\frac{1}{4a\cos^4\left(\frac{t}{2}\right)}$

(D) $\frac{-1}{4a\cos^4\left(\frac{t}{2}\right)}$

Answer: (B) $\frac{-1}{4a\sin^4\left(\frac{t}{2}\right)}$ · The council's preliminary key

Q254 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If $y = \mathrm{Cos}^{-1}(\tanh x) + \sinh(\sin 6x)$, then $\frac{dy}{dx} =$

(A) $\frac{-1}{\cosh x} + 6\cos 6x \cosh(\sin 6x)$

(B) $\frac{1}{\cosh x} - 6\cos 6x \cosh(\sin 6x)$

(C) $\frac{-1}{\cosh x} - 6\cos 6x \cosh(\sin 6x)$

(D) $\frac{1}{\cosh x} + 6\cos 6x \cosh(\sin 6x)$

Answer: (A) $\frac{-1}{\cosh x} + 6\cos 6x \cosh(\sin 6x)$ · The council's preliminary key

Q255 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If $y = x^{\sqrt{x}}$, then $\frac{dy}{dx} =$

(A) $\frac{\ln x}{2\sqrt{2}}$

(B) $\frac{x^{\sqrt{x}}}{\sqrt{x}}$

(C) $\frac{y\ln x}{2\sqrt{x}}$

(D) $\frac{y(\ln x+2)}{2\sqrt{x}}$

Answer: (D) $\frac{y(\ln x+2)}{2\sqrt{x}}$ · The council's preliminary key

Q256 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

If $x = 5(1 - \sin t),\ y = 5(t + \cos t)$, then $\frac{dx}{dy} =$

(A) $\frac{\sin t - 1}{\cos t}$
(B) $\frac{\cos t}{\sin t - 1}$
(C) $\tan \frac{t}{2}$
(D) $\frac{\cos \frac{t}{2} - \sin \frac{t}{2}}{\cos \frac{t}{2} + \sin \frac{t}{2}}$

Answer: (B) $\frac{\cos t}{\sin t - 1}$ · The council's preliminary key

Q257 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

If $x^2 + xy + y^2 = k$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{-6k}{(x+2y)^3}$
(B) $\frac{-6k}{(x+2y)^2}$
(C) $\frac{x^2+xy+y^2}{(2x+y)^2}$
(D) 0

Answer: (A) $\frac{-6k}{(x+2y)^3}$ · The council's preliminary key

Q258 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

If the function $f(x) = x(x + 3)e^{\frac{-x}{2}}$ satisfies all the conditions of Rolle's theorem in $[-3, 0]$, then a root of $f'(x) = 0$ is

(A) 3
(B) -1
(C) -2
(D) -3

Answer: (C) -2 · The council's preliminary key

Q259 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If $f(x) = \text{Tan}^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right)$ then $\underset{x \to \frac{1}{2}}{Lt} \frac{2\left[f(x) - f\left(\frac{1}{2}\right)\right]}{2x - 1} =$

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(A) $\frac{1}{\sqrt{2}}$
(B) $\frac{\sqrt{3}}{2}$
(C) $\frac{\sqrt{2}}{\sqrt{3}}$
(D) $\frac{1}{\sqrt{3}}$

Answer: (D) $\frac{1}{\sqrt{3}}$ · The council's preliminary key

Q260 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If $\frac{d}{dx}\left(\frac{x2^x - x}{1-\cos x}\right) = \left(\frac{x2^x - x}{1-\cos x}\right)(f(x) + \log 2)$, then $f(x) =$

(A) $\frac{1}{x} + \frac{\log 2}{2^x} + \tan\frac{x}{2}$
(B) $\frac{1}{x} + \frac{2^x \log 2}{2^x - 1} + \frac{\sin x}{1-\cos x}$
(C) $x + 2^x - 1 + \sin x(1-\cos x)$
(D) $\frac{1}{x} + \frac{\log 2}{2^x - 1} - \cot\frac{x}{2}$

Answer: (D) $\frac{1}{x} + \frac{\log 2}{2^x - 1} - \cot\frac{x}{2}$ · Checked by our team

Q261 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If $(a+bx)e^{y/x} = x$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{1}{x^3}(xy' + y)^2$
(B) $\frac{1}{x^3}(xy' + y^2)$
(C) $\frac{1}{x^3}(xy' - y)$
(D) $\frac{1}{x^3}(xy' - y)^2$

Answer: (D) $\frac{1}{x^3}(xy' - y)^2$ · The council's preliminary key

Q262 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If $f(x) = \frac{\cos^2 x}{1 + \sin^2 x}$, then $f\left(\frac{\pi}{4}\right) - 3f'\left(\frac{\pi}{4}\right) =$

(A) $\frac{5}{3}$
(B) $\frac{11}{3}$
(C) $\frac{13}{9}$
(D) 3

Answer: (D) 3 · The council's preliminary key

Q263 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

If $f(x) = 3e^{x^2}$ then $f'(x) - 2xf(x) + \frac{1}{3}f(0) - f'(0) =$

(A) 0
(B) 1
(C) $\frac{7}{3}e^{x^2}$
(D) $12xe^{x^2} + 1$

Answer: (B) 1 · The council's preliminary key

Q264 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

If $y = \sin^{-1}\left(\frac{4 + 5\sin x}{5 + 4\sin x}\right)$ then find $\frac{dy}{dx}$

(A) $\frac{3}{5 + 4\sin x}$ only
(B) $\frac{-3}{5 + 4\sin x}$ only
(C) $\frac{\pm 3}{5 + 4\sin x}$
(D) $\frac{3}{4 + 5\sin x}$ only

Answer: (C) $\frac{\pm 3}{5 + 4\sin x}$ · Checked by our team

Q265 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

$\frac{d}{dx}\left(\text{Sin}^{-1}\frac{3 + 4x}{5\sqrt{1 + x^2}}\right) =$

(A) $\frac{1}{1 + x^2}$
(B) $\frac{-1}{1 + x^2}$
(C) $\frac{1}{\sqrt{1 + x^2}}$
(D) $\frac{-1}{\sqrt{1 + x^2}}$

Answer: (A) $\frac{1}{1 + x^2}$ · The council's preliminary key

Q266 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

Eliminating a and b from the relation $y = a\log x + b$, we get _____

(A) $xy_2 + y_1 = 0$
(B) $xy - y^2 = 0$
(C) $xy_1 + y^2 = 0$
(D) $y^2y_2 + x = 0$

Answer: (A) $xy_2 + y_1 = 0$ · The council's preliminary key

Q267 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

If $f(x) = \log_{x^2}(\log x)$, then $f'(e)$ is equal to _____

(A) e
(B) $\frac{1}{e}$
(C) $\frac{1}{2e}$
(D) $2e$

Answer: (C) $\frac{1}{2e}$ · The council's preliminary key

Q268 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

If $\frac{d}{dx}\left(\frac{x^4+x^2+1}{x^2+x+1}\right) = ax + b$, then $a - b =$

(A) 3
(B) 4
(C) 1
(D) 2

Answer: (A) 3 · The council's preliminary key

Q269 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

If $y = \mathrm{Tan}^{-1}\left(\frac{4x}{1+5x^2}\right) + \mathrm{Tan}^{-1}\left(\frac{2+3x}{3-2x}\right)$, then $\frac{dy}{dx} =$

(A) $\frac{1}{1+25x^2} + \frac{2}{1+x^2}$
(B) $\frac{5}{1+25x^2} + \frac{2}{1+x^2}$
(C) $\frac{5}{1+25x^2}$
(D) $\frac{1}{1+25x^2}$

Answer: (C) $\frac{5}{1+25x^2}$ · The council's preliminary key

Q270 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

If $y = \frac{e^x \log x}{x^2}$, then $\frac{dy}{dx} =$

(A) $\frac{e^x\{1+(x+2)\log x\}}{x^3}$

(B) $\frac{e^x\{1-(x-2)\log x\}}{x^4}$

(C) $\frac{e^x\{1-(x-2)\log x\}}{x^3}$

(D) $\frac{e^x\{1+(x-2)\log x\}}{x^3}$

Answer: (D) $\frac{e^x\{1+(x-2)\log x\}}{x^3}$ · The council's preliminary key

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Q271 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

If $\text{Cos}^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right) = \text{Sin}^{-1}(a)$ then $\frac{dy}{dx}$ is equal to

(A) y/x

(B) $-y/x$

(C) x/y

(D) $-x/y$

Answer: (A) y/x · The council's preliminary key

Q272 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

The derivative of $y = \text{Sin}^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{2}\right)$ is

(A) $\frac{1}{\sqrt{1+x^2}}$

(B) $\frac{1}{\sqrt{1-x^2}}$

(C) $\frac{1}{2\sqrt{1+x^2}}$

(D) $\frac{1}{2\sqrt{1-x^2}}$

Answer: (D) $\frac{1}{2\sqrt{1-x^2}}$ · The council's preliminary key

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Q273 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

If $\log\sqrt{x^2+y^2} = \text{Tan}^{-1}\left(\frac{x}{y}\right)$, then $\frac{dy}{dx}$ is equal to

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(A) $\frac{y-x}{y+x}$
(B) $\frac{x+y}{x-y}$
(C) $\frac{1}{y+x}$
(D) $\frac{1}{x-y}$

Answer: (A) $\frac{y-x}{y+x}$ · The council's preliminary key

Q274 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

$\frac{d}{dx}\left\{(1+x^2)\,\mathrm{Tan}^{-1}(x)\right\} =$

(A) $x\,\mathrm{Tan}^{-1}(x)$
(B) $2\,\mathrm{Tan}^{-1}(x)$
(C) $2x\,\mathrm{Tan}^{-1}(x)+1$
(D) $x\,\mathrm{Tan}^{-1}(x)+1$

Answer: (C) $2x\,\mathrm{Tan}^{-1}(x)+1$ · The council's preliminary key

Q275 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

The derivative of $y=\mathrm{Tan}^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right]$ with respect to x is equal to

(A) -1
(B) 0
(C) ± 2
(D) $\pm\frac{1}{2}$

Answer: (D) $\pm\frac{1}{2}$ · The council's preliminary key

Q276 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

If $x=e^{y+e^{y+e^{y+\cdots}}}$, then $\frac{dy}{dx}=$

(A) $\frac{1-x}{x}$
(B) $\frac{1}{x}$
(C) $\frac{x}{1+x}$
(D) $\frac{1+x}{x}$

Answer: (A) $\frac{1-x}{x}$ · The council's preliminary key

Q277 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

Find the value of 'p' and 'q' if the function $f(t)=t^3-6t^2+pt+q$ defined on $[1,3]$ satisfies the Rolle's theorem for $c=\frac{2\sqrt{3}+1}{\sqrt{3}}$

(A) $p \in R,\ q = 11$
(B) $p = 11,\ q \in R$
(C) $p \in R,\ q \in R$
(D) $p = 11,\ q = 11$

Answer: (B) $p = 11,\ q \in R$ · The council's preliminary key

Q278 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

The derivate of $y = \text{Tan}^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ is equal to

(A) $\frac{2}{(1+x^2)}$
(B) $\frac{1}{2(1+x^2)}$
(C) $(1+x^2)$
(D) $2(1+x^2)$

Answer: (B) $\frac{1}{2(1+x^2)}$ · The council's preliminary key

Q279 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

If $f(x) = x^4 - x^3 + 7x^2 + 14$, then what is the value of $f''(5)$?

(A) 842
(B) 248
(C) 284
(D) 482

Answer: (C) 284 · The council's preliminary key

Q280 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

If $y = \sqrt{\frac{1+\tan x}{1-\tan x}}$, then $\frac{dy}{dx} =$

(A) $\frac{1}{2}\left(\sqrt{\frac{1-\tan x}{1+\tan x}}\right)\sec^2\left(\frac{\pi}{4}+x\right)$
(B) $\frac{1}{2}\left(\sqrt{\frac{1-\tan x}{1+\tan x}}\right)\sec\left(\frac{\pi}{4}+x\right)$
(C) $\left(\sqrt{\frac{1-\tan x}{1+\tan x}}\right)\sec^2\left(\frac{\pi}{4}+x\right)$
(D) $\frac{1}{2}\left(\sqrt{\frac{1+\tan x}{1-\tan x}}\right)\sec^2\left(\frac{\pi}{4}+x\right)$

Answer: (A) $\frac{1}{2}\left(\sqrt{\frac{1-\tan x}{1+\tan x}}\right)\sec^2\left(\frac{\pi}{4}+x\right)$ · The council's preliminary key

Q281 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

Find $\frac{dy}{dx}$ if $2x^2 - 3xy + y^2 + x + 2y - 8 = 0$

(A) $\frac{3y - 4x - 1}{2y - 3x + 2}$

(B) $\frac{3y + 4x - 1}{2y - 3x + 2}$

(C) $\frac{3y - 4x - 1}{2y + 3x + 2}$

(D) $\frac{3y - 4x - 1}{2y - 3x - 2}$

Answer: (A) $\frac{3y - 4x - 1}{2y - 3x + 2}$ · The council's preliminary key

Q282 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

If $y = \sqrt{2x + \cos^2\left(2x + \frac{\pi}{4}\right)}$ then $\frac{dy}{dx}$ at $x = \frac{\pi}{4}$

(A) $\frac{2\sqrt{2}}{\sqrt{\pi + 1}}$

(B) $2\sqrt{\pi + 1}$

(C) $\frac{2}{\sqrt{\pi + 1}}$

(D) $\frac{\sqrt{2}}{\sqrt{\pi + 1}}$

Answer: (A) $\frac{2\sqrt{2}}{\sqrt{\pi + 1}}$ · The council's preliminary key

Q283 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

If $f(x) = x^4 - x^3 + 7x^2 + 14$, then what is the value of $f'(5)$?

(A) 594

(B) 549

(C) 954

(D) 495

Answer: (D) 495 · The council's preliminary key

Q284 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

If $f(x) = \sqrt{x + 2\sqrt{2x - 4}} + \sqrt{x - 2\sqrt{2x - 4}}$, then the value of $10 \times f'(102) =$

(A) 1
(B) 2
(C) 102
(D) -1

Answer: (A) 1 · The council's preliminary key

Q285 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

$\frac{d}{dx}\left(e^{\log_e \sqrt{1+\tan^2 x}}\right) =$

(A) $\sec^2(x) \cdot \tan(x)$
(B) $\sec(x) \cdot \tan^2(x)$
(C) $\sec(x) \cdot \tan(x)$
(D) $\tan^2(x)$

Answer: (C) $\sec(x) \cdot \tan(x)$ · The council's preliminary key

Q286 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

The derivative of $f(x) = \text{Cos}^{-1}\left[\sin\sqrt{\frac{1+x}{2}}\right] + x^x$ with respect to x at $x = 1$ is equal to

(A) 1
(B) $\frac{1}{4}$
(C) $\frac{3}{4}$
(D) $\frac{2}{3}$

Answer: (C) $\frac{3}{4}$ · The council's preliminary key

Q287 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

If $y = \sin^{98}(x) \cdot \cos^{39}(x)$, find $\frac{dy}{dx}$

(A) $(98\cos^{99} x \cdot \sin^{38} x) + (39\sin^{40} x \cdot \cos^{97} x)$
(B) $(99\cos^{98} x \cdot \sin^{39} x) - (40\sin^{39} x \cdot \cos^{98} x)$
(C) $(98\cos^{99} x \cdot \sin^{38} x) - (39\sin^{40} x \cdot \cos^{97} x)$
(D) $(99\cos^{98} x \cdot \sin^{39} x) + (39\sin^{40} x \cdot \cos^{97} x)$

Answer: (C) $(98\cos^{99} x \cdot \sin^{38} x) - (39\sin^{40} x \cdot \cos^{97} x)$ · The council's preliminary key

Q288 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

The derivative of $\text{Tan}^{-1}\left[\frac{x}{1+\sqrt{1-x^2}}\right]$ with respect to $\text{Sec}^{-1}\left(\frac{1}{2x^2-1}\right)$ is

(A) $\frac{1}{2}$
(B) $\frac{1}{4}$
(C) $\frac{-1}{4}$
(D) $\frac{-1}{2}$

Answer: (C) $\frac{-1}{4}$ · The council's preliminary key

Q289 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

If $x^{2019} \cdot y^{2020} = (x+y)^{4039}$, then $\frac{dy}{dx} =$

(A) 0
(B) $\frac{x}{y}$
(C) $\frac{y}{x}$
(D) 1

Answer: (C) $\frac{y}{x}$ · The council's preliminary key

Q290 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

$\frac{d}{dx}\left(\text{Cos}^{-1}\left(\frac{4x^3}{27} - x\right)\right) =$

(A) $\frac{3}{\sqrt{9-x^2}}$
(B) $\frac{1}{\sqrt{9-x^2}}$
(C) $\frac{-3}{\sqrt{9-x^2}}$
(D) $\frac{-1}{\sqrt{9-x^2}}$

Answer: (C) $\frac{-3}{\sqrt{9-x^2}}$ · The council's preliminary key

Q291 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

Differentiation of $(x^2 - 5x + 8) \times (x^3 + 7x + 9)$ can be done by _____

(A) Only by using product rule
(B) Only by obtaining a single polynomial, expanding it
(C) Only by using logarithmic differentiation
(D) All of the options are correct

Answer: (D) All of the options are correct · The council's preliminary key

Q292 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

If $\log(x+y) - 2xy = 0$ then $y'(0) =$

(A) $2y^2+1$
(B) $2y^2-1$
(C) 0
(D) $2y^2$

Answer: (B) $2y^2-1$ · The council's preliminary key

Q293 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

If $y(x)=\text{Tan}^{-1}\left(\frac{\sqrt{1+a^2x^2}-1}{ax}\right)$ and $(1+a^2x^2)y''+g(x)y'=0$ then, the sum of the roots of the equation $1+a^2x^2+g(x)=0$ is

(A) $2a$
(B) $-2a^2$
(C) 2
(D) -2

Answer: (D) -2 · Official TGCHE final key

Q294 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

$\frac{d}{dx}\left[\text{cosech}^{-1}(\tan 2x)\right]=$

(A) $2|\sec 2x|$
(B) $\cos 2x$
(C) $-2|\text{cosec}\,2x|$
(D) $\sin 2x$

Answer: (C) $-2|\text{cosec}\,2x|$ · Official TGCHE final key

Q295 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

If $x\sqrt{1+y}+y\sqrt{1+x}=0$, then $\frac{dy}{dx}=$

(A) $\frac{-1}{(1+x)^2}$
(B) $\frac{1}{(1+x)^2}$
(C) $\frac{2}{(1+x)^{3/2}}$
(D) $\frac{-2}{(1+x)^{1/2}}$

Answer: (A) $\frac{-1}{(1+x)^2}$ · Official TGCHE final key

Q296 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

If $p(x)$ be a polynomial satisfying $p(2x)=p'(x)\cdot p''(x)$, then $\sum_{x=1}^{5}p(x)=$

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(A) 200
(B) 100
(C) 50
(D) 450

Answer: (B) 100 · Official TGCHE final key

Q297 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

If $2^x + 2^y = 2^{x+y}$, then $\frac{dy}{dx} =$

(A) $1 - 2^y$
(B) $1 - 2^{-y}$
(C) $1 + 2^y$
(D) $1 + 2^{-y}$

Answer: (A) $1 - 2^y$ · Official TGCHE final key

Q298 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

Consider the following statements
Statement (I): If $a_0 + \frac{a_1}{2} + \frac{a_2}{3} + \ldots\ldots + \frac{a_n}{n+1} = 0$, where $a_0, a_1, \ldots . a_n$ are real numbers, then the polynomial $a_0 + a_1x + a_2x^2 + \ldots\ldots + a_nx^n$ has a zero in the interval $(0, 1)$
Statement (II): If $f : [a, b] \to \mathbb{R}$ is continuous on $[a, b]$ and f is differentiable in (a, b), where $a > 0$ and if $\frac{f(a)}{a} = \frac{f(b)}{b}$, then there exists $c \in (a, b)$ such that $cf'(c) = f(c)$
Which one of the following options is true?

(A) only (I) is true
(B) only (II) is true
(C) neither (I) nor (II) is true
(D) both (I) and (II) are true

Answer: (D) both (I) and (II) are true · Official TGCHE final key

Q299 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

If $f(x) = \frac{x-1}{e^x}$, then $f'(0) + f''(0) =$

(A) 0
(B) 1
(C) -1
(D) 2

Answer: (C) -1 · Official TGCHE final key

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Q300 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

If $\left(\frac{dy}{dx}\right) = \frac{1}{\left(\frac{dx}{dy}\right)}$ and $\frac{d^2x}{dy^2}\left(\frac{dy}{dx}\right)^3 + \frac{d^2y}{dx^2} = k$, then $e^{kf(x)} - kf(x) =$

(A) 1
(B) 0
(C) $\frac{1}{2}$
(D) 2

Answer: (A) 1 · Official TGCHE final key

Q301 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

Let $g(x) \neq 0$, $g'(x) \neq 0$, $f(x) \neq 0$, $f'(x) \neq 0$. If $F(x) = f(x)g(x)$, $G(x) = f'(x)g'(x)$ and $F'(x) = G(x)H(x) = F(x)K(x)$, then $H(x) + K(x) =$

(A) $\frac{f'}{f} + \frac{f}{f'} + \frac{g}{g'}$
(B) $\frac{f'}{f} + \frac{g}{g'} + \frac{g'}{g}$
(C) $\frac{f'g' + fg}{ff'gg'}$
(D) $\frac{f'}{f} + \frac{g}{g'} + \frac{f}{f'} + \frac{g'}{g}$

Answer: (D) $\frac{f'}{f} + \frac{g}{g'} + \frac{f}{f'} + \frac{g'}{g}$ · Official TGCHE final key

Q302 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

If $y = \frac{x\,\mathrm{Sin}^{-1}x}{\sqrt{1-x^2}} + \log\sqrt{1-x^2}$, then $\frac{dy}{dx} =$

(A) $\frac{\mathrm{Sin}^{-1}x}{1-x^2}$
(B) $\frac{\mathrm{Sin}^{-1}x}{(1-x^2)^{3/2}}$
(C) $\frac{x}{1-x^2}$
(D) $\frac{x\,\mathrm{Sin}^{-1}x}{\sqrt{1-x^2}} - \frac{2x}{\sqrt{1-x^2}}$

Answer: (B) $\frac{\mathrm{Sin}^{-1}x}{(1-x^2)^{3/2}}$ · Official TGCHE final key

Q303 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

Let $f(x)$ and $g(x)$ be twice differentiable functions such that $f(x) = x^2 + g'(1).x + g''(2)$ and $g(x) = f(1)x^2 + xf'(x) + f''(x)$. Then, $f(x) - g(x) =$

(A) $2x + 5$
(B) $3x^2 + 6x + 1$
(C) $x^2 - 6x + 2$
(D) $x^2 - 2$

Answer: (D) $x^2 - 2$ · Official TGCHE final key

Q304 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

In each of the choices given below, a function and an interval are given. The correct choice having a function and the associated interval for which the Lagrange's mean value theorem is not valid is

(A) $|x|; [1, 5]$
(B) $\log x; [1, e]$
(C) $\frac{2x-1}{3x-4}; [1, 2]$
(D) $(x-2)^2(x-4)^2; [2, 4]$

Answer: (C) $\frac{2x-1}{3x-4}; [1, 2]$ · Official TGCHE final key

Q305 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

If α is such a minimum value for which the inverse of $f(x) = x^2 + 3x - 3$ exists in $[\alpha, \infty)$ and g is the inverse of the f then at $x = \alpha + \frac{5}{2}$, $\frac{dg}{dx} =$

(A) $\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{4}$
(D) $\frac{1}{5}$

Answer: (D) $\frac{1}{5}$ · Official TGCHE final key

Q306 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

If $y = e^{ax}(\cos bx + \sin bx)$ satisfies the equation $\frac{d^2y}{dx^2} - K\frac{dy}{dx} + Ly = 0$, then $L + bK =$

(A) 0
(B) $(a+b)^2$
(C) $a^2 - b^2$
(D) $a^2 + b^2$

Answer: (B) $(a+b)^2$ · Official TGCHE final key

Q307 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

Let $f : [2, 5] \to \mathbb{R}$ be a differentiable function and $\frac{f(5)}{f(2)} = 1$. If there is a $c \in (2, 5)$ such that $cf'(c) = 2f(c) - 2c^3$ then $f(x) =$

(A) $-2x^3+\frac{78}{7}x^2$

(B) $x^3-8x^2+17x-10$

(C) $x^3-6x^2+3x+10$

(D) x^3-7x^2+10x

Answer: (A) $-2x^3+\frac{78}{7}x^2$ · Official TGCHE final key

Q308 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

For $x\neq -1$, $y\neq -1$ if $x=\frac{1-\sqrt[3]{y}}{1+\sqrt[3]{y}}$ then $\frac{dx}{dy}=$

(A) $\frac{-6(1-x)^2}{(1+x)^4}$

(B) $\frac{-(1+x)^4}{6(1-x)^2}$

(C) $\frac{4(1-x)^4}{(1+x)^6}$

(D) $\frac{-6(1+x)^2}{(1-x)^4}$

Answer: (B) $\frac{-(1+x)^4}{6(1-x)^2}$ · Official TGCHE final key

Q309 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

Assertion (A) : For $x<0$, $\frac{d^2}{dx^2}(\log|x|)=\frac{1}{|x|^2}$

Reason (R) : For $x<0$, $|x|=-x$

The correct option among the following is

(A) (A) is true, (R) is true and (R) is the correct explanation to (A)

(B) (A) is true, (R) is true but (R) is not a correct explanation to (A)

(C) (A) is true, (R) is false

(D) (A) is false, (R) is true

Answer: (D) (A) is false, (R) is true · Official TGCHE final key

Q310 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

If $ax^2+2hxy+by^2=0$, then $\frac{d^2y}{dx^2}=$

(A) $\frac{h^2-ab}{(hx+by)^3}$

(B) $\frac{2(h^2-ab)}{(hx+by)^3}$

(C) $\frac{(hx+by)^3}{h^2-ab}$

(D) 0

Answer: (D) 0 · Official TGCHE final key

Q311 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

The number of admissible values of C obtained when the Lagrange's mean value theorem is applied for the function $f(x)=x$ on [2, 5] is

(A) 0
(B) only one
(C) infinite
(D) finitely many

Answer: (C) infinite · Official TGCHE final key

Q312 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

If $f(x)=\frac{(x+1)\sinh x}{e^{2x}\tan x}$ and $\frac{f'(x)}{f(x)}=\frac{1}{x+1}+\coth x+g(x)$, then $g(x)=$

(A) $-2+\frac{1}{\sin x\cos x}$
(B) $2-2\operatorname{cosec}2x$
(C) $-2(1+\operatorname{cosec}2x)$
(D) $2-\frac{1}{\sin x\cos x}$

Answer: (C) $-2(1+\operatorname{cosec}2x)$ · Official TGCHE final key

Q313 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

If $x^y=y^{\sin x}(\tan x)^{\cos x}$, then $\left(\log x-\frac{\sin x}{y}\right)\frac{dy}{dx}=$

(A) $\cos x\log y-\sin x\log(\tan x)+\operatorname{cosec}x-\frac{y}{x}$
(B) $\cos x\log y-\sin x\log(\tan x)+\cos^2 x\operatorname{cosec}x-\frac{y}{x}$
(C) $\frac{\cos x}{x}-\sin^2 x\sec x$
(D) $\cos x-x\sin^2 x\sec x$

Answer: (A) $\cos x\log y-\sin x\log(\tan x)+\operatorname{cosec}x-\frac{y}{x}$ · Official TGCHE final key

Q314 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$, then $\left[(1-x^2)^2\frac{d^2y}{dx^2}+y(1-x^2)\right]\frac{dy}{dx}=$

(A) 0
(B) $x(1-y^2)$
(C) $y(1-x^2)$
(D) $\sqrt{1-x^2}\sqrt{1-y^2}$

Answer: (B) $x(1-y^2)$ · Official TGCHE final key

Q315 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

If the Rolle's theorem holds for the function $f(x) = x^4 + ax^3 + bx$, in $-1 \leq x \leq 1$, and $f'\left(\frac{1}{2}\right) = 0$, then $ab =$

(A) -4
(B) -64
(C) -1
(D) -8

Answer: (A) -4 · Official TGCHE final key

Q316 TS EAMCET 2019 · 6 May · Shift 1 MCQ

If $\sqrt{\frac{y}{x}} + 4\sqrt{\frac{x}{y}} = 4$, then $\frac{dy}{dx} =$

(A) xy
(B) $\frac{x}{y}$
(C) -4
(D) 4

Answer: (D) 4 · Official TGCHE final key

Q317 TS EAMCET 2019 · 6 May · Shift 1 MCQ

If $y^{\cos x} = x^{\sin y}$, then $\frac{dy}{dx} =$

(A) $\frac{y(x \sin x \log y + \sin y)}{x(\cos x - y \log x \cos y)}$
(B) $\frac{y(x \sin x \log x - \sin y)}{x(\cos x + y \log x \cos y)}$
(C) $\frac{y(\sin y - x \log y)}{x(x - y \cos y(\log x))}$
(D) $\frac{y(\sin y + x \log y)}{x(x + y \cos y(\log x))}$

Answer: (A) $\frac{y(x \sin x \log y + \sin y)}{x(\cos x - y \log x \cos y)}$ · Official TGCHE final key

Q318 TS EAMCET 2019 · 6 May · Shift 1 MCQ

If $\sqrt{x+y} - \sqrt{x-y} = c$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{1}{y}\left(\frac{dy}{dx}\right)^2$

(B) $\frac{-c^4}{4y^3}$

(C) $y\left(\frac{dy}{dx}\right)^2$

(D) $\frac{-c^2}{4y^3}$

Answer: (B) $\frac{-c^4}{4y^3}$ · Official TGCHE final key

Q319 TS EAMCET 2019 · 6 May · Shift 1 MCQ

If the tangent drawn at a point P on the curve $y = 3x^2 - 5x + 7$ is parallel to its chord joining the points $(1, y_1)$ and $(2, y_2)$ on it, then the x-coordinate of the point P is

(A) $\sqrt{2}$

(B) $\frac{3}{2}$

(C) $\frac{5}{4}$

(D) $\frac{4}{3}$

Answer: (B) $\frac{3}{2}$ · Official TGCHE final key

Q320 TS EAMCET 2019 · 4 May · Shift 1 MCQ

If $f(x) = \cosh^{-1}\left(\frac{1-x}{1+x}\right)$ is well defined, then $f'(x) =$

(A) $\frac{-1}{(1+x)\sqrt{-x}}$

(B) $\frac{1}{(1+x)\sqrt{x}}$

(C) $\frac{-1}{(1+x)\sqrt{x}}$

(D) $\frac{1}{(1+x)\sqrt{-x}}$

Answer: (A) $\frac{-1}{(1+x)\sqrt{-x}}$ · Official TGCHE final key

Q321 TS EAMCET 2019 · 4 May · Shift 1 MCQ

If $\frac{dy}{dx} = 4$ and $\frac{d^2y}{dx^2} = -3$ at a point P on the curve $y = f(x)$, then $\left(\frac{d^2x}{dy^2}\right)_P =$

(A) 0

(B) $\frac{-3}{4}$

(C) $\frac{3}{16}$

(D) $\frac{3}{64}$

Answer: (D) $\frac{3}{64}$ · Official TGCHE final key

Q322 TS EAMCET 2019 · 4 May · Shift 2 MCQ

If t is a parameter and $x = t + \frac{1}{t},\ y = t - \frac{1}{t}$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{4t}{(t^2+1)^2}$
(B) $\frac{t^2}{t^2+1}$
(C) $\frac{4t^3}{(t^2+1)^3}$
(D) $\frac{-4t^3}{(t^2-1)^3}$

Answer: (D) $\frac{-4t^3}{(t^2-1)^3}$ · Official TGCHE final key

Q323 TS EAMCET 2019 · 4 May · Shift 2 MCQ

If $ax^2 + 2hxy + by^2 = 3$, then $\frac{d^2y}{dx^2} =$

(A) $-\frac{(hx^2+by+ax)}{(ax+hy)^2}$
(B) $\frac{(axy+hx^2+byx)}{(ax+by)^2}$
(C) $\frac{3(h^2-ab)}{(hx+by)^3}$
(D) $\frac{(ab+h)^2}{(ax+hy)^2}\left[h(x^2+y^2)+xy(a+b)\right]$

Answer: (C) $\frac{3(h^2-ab)}{(hx+by)^3}$ · Official TGCHE final key

Q324 TS EAMCET 2019 · 3 May · Shift 1 MCQ

If $y = (x+1)(x^2+1)(x^4+1)(x^8+1)$, then $\lim_{x\to -1} \frac{dy}{dx} =$

(A) 0
(B) 2
(C) -4
(D) 8

Answer: (D) 8 · Official TGCHE final key

Q325 TS EAMCET 2019 · 3 May · Shift 1 MCQ

$f(x)$ is a twice differentiable function such that $f''(x) = -f(x)$ and $f'(x) = g(x)$. If $h(x) = (f(x))^2 + (g(x))^2$ and $h(1) = 2$, then $h(2) =$

(A) 0
(B) 1
(C) 2
(D) 4

Answer: (C) 2 · Official TGCHE final key

Q326 TS EAMCET 2019 · 3 May · Shift 1 MCQ

If $y=\sqrt{x+\sqrt{y+\sqrt{x+\sqrt{y+\ldots\infty}}}}$, then $\frac{dy}{dx}=$

(A) $\frac{y^3-x}{2y^2-2xy+1}$
(B) $\frac{x+y^3}{2y^2-x}$
(C) $\frac{y+x}{y^2-2x}$
(D) $\frac{y^2-x}{2y^3-2xy-1}$

Answer: (D) $\frac{y^2-x}{2y^3-2xy-1}$ · Official TGCHE final key

Q327 TS EAMCET 2019 · 3 May · Shift 1 MCQ

The slope of the tangent at $(1,2)$ to the curve $x=t^2-7t+7$ and $y=t^2-4t-10$ is

(A) $\frac{8}{5}$
(B) $\frac{5}{8}$
(C) $-\frac{8}{5}$
(D) $-\frac{5}{8}$

Answer: (A) $\frac{8}{5}$ · Official TGCHE final key

Q328 TS EAMCET 2019 · 3 May · Shift 2 MCQ

Suppose $f(x)=e^{-\sqrt{x}}+e^{-\frac{1}{x^2}}$. If $f''(x)=\alpha\frac{e^{-\sqrt{x}}}{x}\left(1+\frac{1}{\sqrt{x}}\right)+\beta\frac{e^{-\frac{1}{x^2}}}{x^4}\left(3-\frac{2}{x^2}\right)$, then $(\alpha,\beta)=$

(A) $\left(\frac{1}{4},2\right)$
(B) $\left(\frac{1}{4},-2\right)$
(C) $\left(-\frac{1}{4},2\right)$
(D) $\left(-\frac{1}{4},-2\right)$

Answer: (B) $\left(\frac{1}{4},-2\right)$ · Official TGCHE final key

Q329 TS EAMCET 2019 · 3 May · Shift 2 MCQ

The derivative of $\mathrm{Cosh}^{-1}x$ with respect to $\log x$ at $x=5$ is

(A) $\frac{5}{\sqrt{26}}$
(B) $\frac{1}{\sqrt{26}}$
(C) $\frac{1}{2\sqrt{6}}$
(D) $\frac{5}{2\sqrt{6}}$

Answer: (D) $\frac{5}{2\sqrt{6}}$ · Official TGCHE final key

Q330 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

If $\cos(f(x)) = \frac{1-x^2}{1+x^2}$ and $\tan(g(x)) = \frac{3x-x^3}{1-3x^2}$, then $\frac{df}{dg} =$

(A) $\frac{3}{2}$
(B) $\frac{1+x^2+2x^3}{(1-3x^2)^2}$
(C) $\frac{2}{3}$
(D) $\frac{x^2+x^3}{(1+x^2)(1-3x^2)}$

Answer: (C) $\frac{2}{3}$ · Official APSCHE final key

Q331 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

If $x^2+y^2 = t - \frac{1}{t}$ and $x^4+y^4 = t^2 + \frac{1}{t^2}$, then $\frac{dy}{dx} =$

(A) $\frac{2}{x^3}$
(B) $\frac{2}{x^3y}$
(C) $\frac{1}{x^3}$
(D) $\frac{1}{x^3y}$

Answer: (D) $\frac{1}{x^3y}$ · Official APSCHE final key

Q332 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

If $x = \sin\theta$ and $y = \cos p\theta$, then $(1-x^2)y_2 =$

(A) $xy_1 - p^2y$
(B) $p^2y - xy_1$
(C) xy_1
(D) p^2y

Answer: (A) $xy_1 - p^2y$ · Official APSCHE final key

Q333 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

Let f be a polynomial function defined on $[2, 7]$. If $f(2) = 3$ and $f'(x) \leq 5$ for all x in $(2, 7)$, then the maximum possible value attained by f at $x = 7$ is

(A) 7
(B) 14
(C) 18
(D) 28

Answer: (D) 28 · Official APSCHE final key

Q334 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Match for each functions in List-I to its derivative given in List-II.
List - I
A) $\text{Sin}^{-1}\left(\frac{2x}{1+x^2}\right)$
B) $\text{Tan}^{-1}\left(\frac{1-x}{1+x}\right)$
C) $e^{\log(\sin x + \cos x)}$
D) $\sqrt{1-\sin 2x}\ \left(0 < x < \frac{\pi}{4}\right)$
List - II
I) $\cos x - \sin x$
II) $\frac{-1}{1+x^2}$
III) $\frac{2}{1+x^2}$
IV) $\cos x + \sin x$
V) $-\sin x - \cos x$
The correct match is

(A) A-III, B-II, C-I, D-V
(B) A-II, B-III, C-V, D-IV
(C) A-II, B-III, C-V, D-I
(D) A-III, B-II, C-I, D-IV

Answer: (A) A-III, B-II, C-I, D-V · Official APSCHE final key

Q335 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

If $f(t) = \frac{1+\cos 2t}{1-\cos 2t}$ for $0 < t < \frac{\pi}{2}$ and $f'(t) = f(t)g(t)$, then $g(t) =$

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(A) $-4\operatorname{cosec} 2t$

(B) $4\operatorname{cosec} 2t$

(C) $2\sin 2t$

(D) $4\operatorname{cosec} t$

Answer: (A) $-4\operatorname{cosec} 2t$ · Official APSCHE final key

Q336 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

If $x = 4\cos^3\theta$ and $y = 3\sin^2\theta$, then $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{4}$ is

(A) $\frac{1}{3}$

(B) $\frac{1}{6}$

(C) $\frac{-1}{6}$

(D) $\frac{-1}{3}$

Answer: (B) $\frac{1}{6}$ · Official APSCHE final key

Q337 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Let a, b, c be real numbers such that $2a + 3b + 6c = 0$ and $g(x) \equiv ax^2 + bx + c = 0$ has atleast one root in the interval $(1, 2)$. If a function $f : [1, 2] \to \mathbb{R}$ for which Rolle's mean value theorem holds is such that $f(x)$ is a primitive of $g(x)$, then $f(x) =$

(A) $x^3 - 3x^2 + 2x$

(B) $3x^3 - 6x^2 + 2x$

(C) $12x^3 - 14x^2 + 3x$

(D) $3x^3 - x$

Answer: (A) $x^3 - 3x^2 + 2x$ · Official APSCHE final key

Q338 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

If $x = \operatorname{Sinh}^{-1}\left[\log\left(1 + \sqrt{y}\right)\right]$, then $\frac{dy}{dx} =$

(A) $2\left(y + \sqrt{y}\right)\sinh x$

(B) $2\left(y + \sqrt{y}\right)\sqrt{1 - \left(\log\left(1 + \sqrt{y}\right)\right)^2}$

(C) $2\left(y + \sqrt{y}\right)\cosh x$

(D) $2\left(y + \sqrt{y}\right)\log\left(1 + \sqrt{y}\right)$

Answer: (C) $2\left(y + \sqrt{y}\right)\cosh x$ · Official APSCHE final key

Q339 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

If $f(x) = \frac{(7x+1)\sin x}{e^x \log x}$ and $f'(x) = f(x)\,g(x)$, then $g'(x) =$

(A) $\frac{1}{x^2\log x}+\frac{1}{(x\log x)^2}-\operatorname{cosec}^2 x-\frac{49}{(7x+1)^2}$

(B) $\frac{1}{x^2\log x}+\frac{1}{\log x}-\operatorname{cosec}^2 x-\frac{49}{(7x+1)^2}$

(C) $\frac{1}{(x\log x)^2}+\frac{x}{\log x}-\operatorname{cosec}^2 x-\frac{49}{(7x+1)^2}$

(D) $\frac{1}{x^2\log x}+\frac{1}{(x\log x)^2}+\operatorname{cosec}^2 x+\frac{49}{(7x+1)^2}$

Answer: (A) $\frac{1}{x^2\log x}+\frac{1}{(x\log x)^2}-\operatorname{cosec}^2 x-\frac{49}{(7x+1)^2}$ · Official APSCHE final key

Q340 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

Let $f:\left[0,\frac{1}{2}\right]\to\mathbb{R}$ be given by $f(x)=x(x-1)(x-2)$. The value 'c', when Lagrange's mean-value theorem is applied for $f(x)$, is

(A) $\frac{\sqrt{21}}{6}$

(B) $\frac{1}{6}$

(C) $1-\frac{\sqrt{21}}{6}$

(D) $1+\frac{\sqrt{21}}{6}$

Answer: (C) $1-\frac{\sqrt{21}}{6}$ · Official APSCHE final key

Q341 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

$\frac{d}{dx}\left(\log\left(\sqrt{x+\sqrt{x^2+a^2}}\right)\right)=$

(A) $\sqrt{x^2+a^2}$

(B) $\frac{1}{\sqrt{x^2+a^2}}$

(C) $\frac{1}{2\sqrt{x^2+a^2}}$

(D) $\frac{1}{2\left(x+\sqrt{x^2+a^2}\right)}$

Answer: (C) $\frac{1}{2\sqrt{x^2+a^2}}$ · Official APSCHE final key

Q342 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

If $f(x)=\operatorname{Cot}^{-1}\left(\frac{x^x-x^{-x}}{2}\right)$, then $f'(1)=$

(A) $-\log 2$

(B) $\log 2$

(C) 1

(D) -1

Answer: (D) -1 · Official APSCHE final key

Q343 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

If $a\neq 0$, $x=a(t+\sin t)$ and $y=a(1-\cos t)$, then $\frac{d^2y}{dx^2}$ at $t=\frac{2\pi}{3}$ is

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(A) $\frac{4}{a}$
(B) $\frac{1}{4a}$
(C) $4a$
(D) $\frac{a}{4}$

Answer: (A) $\frac{4}{a}$ · Official APSCHE final key

Q344 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

If the function $f(x) = ax^3 + bx^2 + 11x - 6$ satisfies the conditions of Rolle's theorem in $[1, 3]$ and $f'\left(2 + \frac{1}{\sqrt{3}}\right) = 0$, then $a + b =$

(A) -5
(B) -3
(C) 4
(D) 7

Answer: (A) -5 · Official APSCHE final key

Q345 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

If $y = \sin^2\left(\text{Cot}^{-1}\sqrt{\frac{1+x}{1-x}}\right)$, then $\frac{dy}{dx} =$

(A) $\frac{-1}{2}$
(B) $\frac{1}{1+x}$
(C) $\frac{1}{1-x}$
(D) 1

Answer: (A) $\frac{-1}{2}$ · Official APSCHE final key

Q346 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

If $a \neq b$, $x \neq n\pi$, $n \in Z$ and $y^2 = a^2\cos^2 x + b^2 \sin^2 x$, then $\frac{d^2y}{dx^2} + y =$

(A) $\left(\frac{ab}{y}\right)^2$
(B) $\frac{1}{y}\left(\frac{ab}{y}\right)^2$
(C) $\frac{(ab)^2}{y}$
(D) $\frac{ab}{y^3}$

Answer: (B) $\frac{1}{y}\left(\frac{ab}{y}\right)^2$ · Official APSCHE final key

Q347 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

Suppose $f''(x)$ exists for all real x. If $f(2) = 2$, $f(3) = 5$ and $f(4) = 10$, then which one among the following statements is definitely true?

(A) $f''(x) < 1$ for some $x \in (2, 4)$

(B) $f''(x) > 1$ for some $x \in (2, 4)$

(C) $f''(x) = 1$ for some $x \in (2, 4)$

(D) $f''(x) = 0$ for some $x \in (2, 4)$

Answer: (B) $f''(x) > 1$ for some $x \in (2, 4)$ · Official APSCHE final key

Q348 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

If $\sqrt{1-x^6} + \sqrt{1-y^6} = a(x^3 - y^3)$, then $y^2 \frac{dy}{dx} =$

(A) $\sqrt{\frac{1-y^6}{1-x^6}}$

(B) $x\sqrt{\frac{1-y^6}{1-x^6}}$

(C) $x^2\sqrt{\frac{1-y^6}{1-x^6}}$

(D) $\frac{1}{x^2}\sqrt{\frac{1-y^6}{1-x^6}}$

Answer: (C) $x^2\sqrt{\frac{1-y^6}{1-x^6}}$ · Official APSCHE final key

Q349 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

If $y = f(x)$ is twice differentiable function such that at a point P, $\frac{dy}{dx} = 4$, $\frac{d^2y}{dx^2} = -3$, then $\left(\frac{d^2x}{dy^2}\right)_P =$

(A) $\frac{64}{3}$

(B) $\frac{16}{3}$

(C) $\frac{3}{16}$

(D) $\frac{3}{64}$

Answer: (D) $\frac{3}{64}$ · Official APSCHE final key

Q350 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

For $m > 1,\ n > 1$, the value of c for which the Rolle's theorem is applicable for the function $f(x) = x^{2m-1}(a-x)^{2n}$ in $(0, a)$ is

(A) $\frac{2am-1}{m+2n-1}$
(B) $\frac{a(m-n+1)}{2m+2n}$
(C) $\frac{a(2m-1)}{2m+2n-1}$
(D) $\frac{a(2m+1)}{m+n-1}$

Answer: (C) $\frac{a(2m-1)}{2m+2n-1}$ · Official APSCHE final key

Q351 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If $x=\sec\theta-\cos\theta$, $y=\sec^{10}\theta-\cos^{10}\theta$ and $(x^2+4)\left(\frac{dy}{dx}\right)^2=k(y^2+4)$, then $k=$

(A) $\frac{1}{100}$
(B) 1
(C) 10
(D) 100

Answer: (D) 100 · Official APSCHE final key

Q352 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If $y=e^{\text{Sin}^{-1}x}$, then $(1-x^2)y_2-xy_1=$

(A) 0
(B) 1
(C) y
(D) $2y$

Answer: (C) y · Official APSCHE final key

Q353 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If $f(x)=x^3+px^2+qx$ is defined on $[0,2]$ such that $f(0)=f(2)$ and $f'\left(1+\frac{1}{\sqrt{3}}\right)=0$, then $p^2+q^2=$

(A) 13
(B) 5
(C) $2+\frac{1}{\sqrt{3}}$
(D) 1

Answer: (A) 13 · Official APSCHE final key

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Q354 TS EAMCET 2018 · 7 May · Shift 1 MCQ

Match the items of List-I with those of List-II

List-I

a) $\frac{d}{dx}\left(\tan^{-1}\left(\sqrt{\frac{1-\cos x}{1+\cos x}}\right)\right)$

b) $\frac{d}{dx}\left(\frac{3+|x-1|}{3x+4}\right)$

c) $\sinh^{-1} x$

d) $\frac{d^2}{dx^2}\left(\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right)$

List-II

i) $\log\left(x+\sqrt{1+x^2}\right)$

ii) $-\frac{4x}{(1+x^2)^2}$

iii) $\frac{1}{2}$

iv) $\frac{1}{\sqrt{1+x^2}}$

v) not differentiable at $x=1$

The correct answer is

(A) a-iii, b-v, c-iv, d-ii

(B) a-iv, b-v, c-ii, d-iii

(C) a-i, b-iii, c-iv, d-v

(D) a-iii, b-v, c-i, d-ii

Answer: (D) a-iii, b-v, c-i, d-ii · The council's preliminary key

Q355 TS EAMCET 2018 · 7 May · Shift 1 MCQ

If $y=2\cos(2\log x)+3\sin(2\log x)$, then $x^2y''+xy'+2y=$

(A) $-2y$

(B) $2y$

(C) 0

(D) 4

Answer: (A) $-2y$ · The council's preliminary key

Q356 TS EAMCET 2018 · 7 May · Shift 1 MCQ

The value c of the Lagrange's mean value theorem for the function $f(x)=x(x-1)(x-2)$ in the interval $\left[0,\frac{1}{2}\right]$ is

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(A) $1-\frac{\sqrt{7}}{2\sqrt{3}}$

(B) $1-\frac{\sqrt{7}}{\sqrt{3}}$

(C) $\frac{1}{3}$

(D) $\frac{1}{6}$

Answer: (A) $1-\frac{\sqrt{7}}{2\sqrt{3}}$ · The council's preliminary key

Q357 TS EAMCET 2018 · 5 May · Shift 1 MCQ

The derivative of $y=(\sin x)^{x^2}$ with respect to x is

(A) $(\sin x)^{x^2}\log(\sin x)$

(B) $x^2(\sin x)^{x^2-1}$

(C) $2x(\sin x)^{x^2}\cos x+2x(\sin x)^{x^2}\log(\sin x)$

(D) $x^2(\sin x)^{x^2-1}\cos x+2x(\sin x)^{x^2}\log(\sin x)$

Answer: (D) $x^2(\sin x)^{x^2-1}\cos x+2x(\sin x)^{x^2}\log(\sin x)$ · The council's preliminary key

Q358 TS EAMCET 2018 · 5 May · Shift 1 MCQ

If $y=\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3e^x}$, then $\frac{dy}{dx}=$

(A) $\frac{(x+1)^3\sqrt{x-1}}{(x+4)^2e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}-\frac{3}{x+4}-1\right]$

(B) $\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}+\frac{3}{x+4}-1\right]$

(C) $\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}-\frac{3}{x+4}-1\right]$

(D) $\frac{(x+1)\sqrt{x-1}}{(4+x)^2e^x}\left[\frac{2}{x+1}+\frac{1}{x-1}-\frac{3}{4+x}-1\right]$

Answer: (C) $\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}-\frac{3}{x+4}-1\right]$ · The council's preliminary key

Q359 TS EAMCET 2018 · 5 May · Shift 1 MCQ

The slope of the tangent to the curve $f(x)=\tanh^{-1}(\sin x)$ at $x=\pi$ is

(A) 1

(B) 0

(C) -1

(D) -2

Answer: (C) -1 · The council's preliminary key

Q360 TS EAMCET 2018 · 5 May · Shift 1 MCQ

Let $f(x)$ be continuous on $[0,4]$, differentiable on $(0,4)$, $f(0)=4$ and $f(4)=-2$. If $g(x)=\frac{f(x)}{x+2}$, then the value of $g'(c)$ for some Lagrange's constant $c\in(0,4)$ is

(A) $\frac{1}{2}$
(B) $\frac{5}{12}$
(C) $-\frac{5}{12}$
(D) $-\frac{7}{12}$

Answer: (D) $-\frac{7}{12}$ · The council's preliminary key

Q361 TS EAMCET 2018 · 5 May · Shift 2 MCQ

$$\frac{d}{dx}\left(\frac{x+5}{(x+1)^2(x+2)}\right) =$$

(A) $\frac{8}{(x+2)^2} - \frac{3}{(x+1)^2} + \frac{3}{(x+1)^3}$
(B) $\frac{3}{(x+1)^2} - \frac{3}{(x+2)^2} - \frac{8}{(x+1)^3}$
(C) $\frac{3}{(x+2)^2} - \frac{3}{(x+1)^3} - \frac{8}{(x+1)^2}$
(D) $\frac{8}{(x+2)^2} - \frac{3}{(x+1)^3} + \frac{3}{(x+1)^2}$

Answer: (B) $\frac{3}{(x+1)^2} - \frac{3}{(x+2)^2} - \frac{8}{(x+1)^3}$ · The council's preliminary key

Q362 TS EAMCET 2018 · 5 May · Shift 2 MCQ

If $y = \left(\text{Sin}^{-1}2x\right)^2 + \left(\text{Cos}^{-1}2x\right)^2$, then $\left(1-4x^2\right)y_2 - 4xy_1 =$

(A) 0
(B) 4
(C) 16
(D) 12

Answer: (C) 16 · The council's preliminary key

Q363 TS EAMCET 2018 · 5 May · Shift 2 MCQ

Let $f(x) = x^3 + 2x^2 - x$ be a real valued function. Then the value of Lagrange's constant C in $(-1, 2)$ is

(A) $\frac{-4+\sqrt{76}}{3}$
(B) $\frac{-2+\sqrt{19}}{3}$
(C) $\frac{-4+\sqrt{19}}{6}$
(D) $\frac{-2+\sqrt{19}}{6}$

Answer: (B) $\frac{-2+\sqrt{19}}{3}$ · The council's preliminary key

Q364 TS EAMCET 2018 · 4 May · Shift 1 MCQ

If $y = \frac{(\text{Sin}^{-1}x)^2}{2}$, then $(1-x^2)y_2 - xy_1 =$

(A) y

(B) $2y$

(C) 1

(D) 2

Answer: (C) 1 · The council's preliminary key

Q365 TS EAMCET 2018 · 4 May · Shift 1 MCQ

Let $f(x)$ be continuous on $[0,6]$ and differentiable on $(0,6)$. Let $f(0) = 12$ and $f(6) = -4$[] If $g(x) = \frac{f(x)}{x+1}$, then for some Lagrange's constant $c \in (0,6)$, $g'(c) =$

(A) $-\frac{44}{3}$

(B) $-\frac{22}{21}$

(C) $\frac{32}{21}$

(D) $-\frac{44}{21}$

Answer: (D) $-\frac{44}{21}$ · The council's preliminary key

Q366 TS EAMCET 2018 · 4 May · Shift 2 MCQ

If $y = \text{Tan}^{-1}(\sin\sqrt{x}) + \text{Cosec}^{-1}(e^{2x+1})$ then $\frac{dy}{dx} =$

(A) $\frac{1}{\sqrt{x}(1+\sin^2\sqrt{x})} + \frac{1}{\sqrt{e^{4x+2}+1}}$

(B) $\frac{\cos\sqrt{x}}{2\sqrt{x}(1+\sin^2\sqrt{x})} - \frac{2}{\sqrt{e^{4x+2}-1}}$

(C) $\frac{\cos\sqrt{x}}{(1+\sin^2\sqrt{x})} + \frac{2}{\sqrt{e^{4x+2}+1}}$

(D) $\frac{1}{2\sqrt{x}}\frac{\cos\sqrt{x}}{(1+\sin^2\sqrt{x})} - \frac{2}{\sqrt{e^{2x+1}-1}}$

Answer: (B) $\frac{\cos\sqrt{x}}{2\sqrt{x}(1+\sin^2\sqrt{x})} - \frac{2}{\sqrt{e^{4x+2}-1}}$ · The council's preliminary key

Q367 TS EAMCET 2018 · 4 May · Shift 2 MCQ

If $y = e^x(\log x)$, then $xy_2 + (x-1)y =$

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(A) $(2x-1)y_1$
(B) $(x-1)y_1$
(C) $(4-2x)y_1$
(D) $(3x-1)y_1$

Answer: (A) $(2x-1)y_1$ · The council's preliminary key

Q368 TS EAMCET 2018 · 4 May · Shift 2 MCQ

Let $f(x)=e^x\cos x+1$. Which of the following statements is always true?

(A) Between any two consecutive roots of $f(x)=0$ there is always a root of $e^x\sin x+1=0$
(B) Between any two consecutive roots of $f(x)=0$ there is always a root of $e^x\sin x-1=0$
(C) Between any two consecutive roots of $f(x)=0$ there is always a root of $e^x\cos x=0$
(D) Between any two consecutive roots of $f(x)=0$ there is always a root of $e^x\sin x=0$

Answer: (A) Between any two consecutive roots of $f(x)=0$ there is always a root of $e^x\sin x+1=0$ · The council's preliminary key

Q369 TS EAMCET 2018 · 4 May · Shift 2 MCQ

Let $f(x)$ be differentiable on $[1,6]$ and $f(1)=-2$. If $f(x)$ has only one root in $(1,6)$ then there exists $c\in(1,6)$ such that

(A) $f'(c)=\frac{1}{10}$
(B) $f'(c)<\frac{2}{5}$
(C) $f'(c)<\frac{1}{5}$
(D) $f'(c)>\frac{2}{5}$

Answer: (D) $f'(c)>\frac{2}{5}$ · The council's preliminary key

Q370 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

$\frac{d}{dx}\left[x^{\sin x}+(\sin x)^x\right]=$

(A) $x^{\sin x}\left[\frac{\sin x}{x}+\cos x\log x\right]+(\sin x)^x\left[x\cot x+\log(\sin x)\right]$
(B) $x^{\sin x}\left[x\tan x+\cos x\log x\right]+(\sin x)^x\left[\frac{\sin x}{x}+\log(\sin x)\right]$
(C) $x^{\sin x}\left[\frac{x}{\sin x}+\cos x\log x\right]+(\sin x)^x\left[x\cot x+\log(\sin x)\right]$
(D) $x^{\sin x}\left[\frac{\sin x}{x}+\sin x\log x\right]+(\sin x)^x\left[x\cot x+\log(\cos x)\right]$

Answer: (A) $x^{\sin x}\left[\frac{\sin x}{x}+\cos x\log x\right]+(\sin x)^x\left[x\cot x+\log(\sin x)\right]$ · The council's preliminary key

Q371 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

If $x=a(t+\sin t)$ and $y=a(1-\cos t)$, then $\frac{d^2y}{dx^2}=$

(A) $\frac{1}{4a\sin^4\left(\frac{t}{2}\right)}$

(B) $\frac{1}{4a\cos^4\left(\frac{t}{2}\right)}$

(C) $4a\,\text{cosec}^4\left(\frac{t}{2}\right)$

(D) $4a\sec^4\left(\frac{t}{2}\right)$

Answer: (B) $\frac{1}{4a\cos^4\left(\frac{t}{2}\right)}$ · The council's preliminary key

Q372 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

If $f(x)=\sqrt{x}$ and $g(x)=\frac{1}{\sqrt{x}}$ for $x\in[3,12]$, then the value of $c\in(3,12)$ for which $\frac{f'(c)}{g'(c)}=\frac{f(12)-f(3)}{g(12)-g(3)}$ holds, is

(A) 7.5

(B) 4.8

(C) 6

(D) 9

Answer: (C) 6 · The council's preliminary key

Q373 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

If $a>b>0$ and x is acute, then $\frac{d}{dx}\left[\text{Cos}^{-1}\left(\frac{b-a\cos x}{a-b\cos x}\right)\right]=$

(A) $\frac{a^2-b^2}{b\cos x-a}$

(B) $\frac{a^2-b^2}{a-b\cos x}$

(C) $\frac{\sqrt{a^2-b^2}}{a-b\cos x}$

(D) $\frac{\sqrt{a^2-b^2}}{b\cos x-a}$

Answer: (D) $\frac{\sqrt{a^2-b^2}}{b\cos x-a}$ · The council's preliminary key

Q374 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

Match the following:

List - I: $f(x,y)=0$

A) $x^2+y^2+3xy=7$

B) $x^{\frac{2}{3}}+y^{\frac{2}{3}}=a^{\frac{2}{3}}$

C) $x^3+y^3=3axy$

D) $xy(x+y)=2$

List - II: $\frac{dy}{dx}$

I) $\frac{x^2+ay}{ax+y^2}$

II) $\frac{-(2x+3y)}{3x+2y}$

III) $-\left(\frac{y}{x}\right)^{\frac{1}{3}}$

IV) $\frac{x^2-ay}{ax-y^2}$

V) $\frac{-y(2x+y)}{x(x+2y)}$

The correct answer is

(A) A-II, B-III, C-IV, D-I
(B) A-II, B-III, C-I, D-IV
(C) A-II, B-III, C-IV, D-V
(D) A-II, B-III, C-V, D-IV

Answer: (C) A-II, B-III, C-IV, D-V · The council's preliminary key

Q375 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

If $y^2 = ax^2 + 2x + c$, then $y^3 \frac{d^2y}{dx^2}$ is

(A) $ac - 1$
(B) $ac + 1$
(C) $4ac - 1$
(D) $ac - 4$

Answer: (A) $ac - 1$ · The council's preliminary key

Q376 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

If a function f is differentiable on $\mathbb{R}$ such that $f'(x) \leq 4$ for all $x \in \mathbb{R}$; and if $f(2) = -6$ and $f(6) = 8$, then the value of $f(4)$ belongs to the interval

(A) $[-2, -1]$
(B) $[3, 4]$
(C) $[0, 2]$
(D) $[5, 8]$

Answer: (C) $[0, 2]$ · The council's preliminary key

Q377 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

If $x = \sec\theta - \cos\theta$, $y = \sec^n\theta - \cos^n\theta$ then $\frac{dy}{dx} =$

(A) $\sqrt{\frac{y^2+4}{x^2+4}}$
(B) $n\sqrt{\frac{y^2+4}{x^2+4}}$
(C) $\sqrt{\frac{x^2+4}{y^2+4}}$
(D) $n\sqrt{\frac{x^2+4}{y^2+4}}$

Answer: (B) $n\sqrt{\frac{y^2+4}{x^2+4}}$ · The council's preliminary key

Q378 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

If $y = a\sin x + (5 + 2x)\cos x$, then $y'' + y =$

(A) $4\cos x$

(B) $-4\cos x$

(C) $4\sin x$

(D) $-4\sin x$

Answer: (D) $-4\sin x$ · The council's preliminary key

Q379 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

If $f(x)=(x-1)(x-2)(x-3)$ for $x\in[0,4]$, then the value of $c\in(0,4)$ satisfying Lagrange's mean value theorem, is

(A) $3\pm\frac{\sqrt{2}}{3}$

(B) $2\pm\frac{2\sqrt{3}}{3}$

(C) $2\pm\frac{\sqrt{3}}{2}$

(D) $3\pm\frac{\sqrt{3}}{3}$

Answer: (B) $2\pm\frac{2\sqrt{3}}{3}$ · The council's preliminary key

Q380 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

If $a>0$ and $f(x)=\left(\frac{a+x}{1+x}\right)^{a+1+2x}$, then $f'(0)=$

(A) a^{a+1}

(B) $a^{a+1}\left\{\frac{1-a^2}{a}+2\log a\right\}$

(C) $2\log a$

(D) $a^{a+1}\left\{\frac{(1+a)^2}{a-2\log a}\right\}$

Answer: (B) $a^{a+1}\left\{\frac{1-a^2}{a}+2\log a\right\}$ · The council's preliminary key

Q381 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

If $y=\log_2(\log_2 x)$, then $\frac{dy}{dx}=$

(A) $\frac{\log_2 e}{2x\log_e x}$

(B) $\frac{1}{x\log_e x\log_e 2}$

(C) $\frac{1}{\log_e(2x)^x}$

(D) $\frac{1}{\log_2 e\ \log_e x}$

Answer: (B) $\frac{1}{x\log_e x\log_e 2}$ · The council's preliminary key

Q382 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

If $y=x\log\left(\frac{x}{2-3x}\right)$ for $0<x<\frac{2}{3}$ then $\frac{d^2y}{dx^2}$ at $x=\frac{1}{2}$ is

(A) 4
(B) 16
(C) 32
(D) 2

Answer: (C) 32 · The council's preliminary key

Q383 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

The constant c of Lagrange's mean value theorem for $f(x) = \cos x - \sin 2x$ in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ is

(A) 0
(B) $\sin^{-1}\left(\frac{1\pm\sqrt{33}}{8}\right)$
(C) $\cos^{-1}\left(\frac{1\pm\sqrt{33}}{8}\right)$
(D) $\pm\frac{\pi}{4}$

Answer: (B) $\sin^{-1}\left(\frac{1\pm\sqrt{33}}{8}\right)$ · The council's preliminary key

Q384 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

The derivative of $f(x) = x^{\mathrm{Tan}^{-1}x}$ with respect to $g(x) = \mathrm{Sec}^{-1}\left(\frac{1}{2x^2-1}\right)$ is

(A) $\frac{1}{2}\sqrt{1-x^2}\,x^{\mathrm{Tan}^{-1}x}\left[\frac{\log x}{1+x^2} + \frac{\mathrm{Tan}^{-1}x}{x}\right]$
(B) $-\frac{1}{2}\sqrt{1-x^2}\,x^{\mathrm{Tan}^{-1}x}\left[\log(\mathrm{Tan}^{-1}x) + x(1+x^2)\mathrm{Tan}^{-1}x\right]$
(C) $\frac{-2\,\mathrm{Tan}^{-1}x\left[\frac{\log x}{1+x^2}+\frac{\mathrm{Tan}^{-1}x}{x}\right]}{\sqrt{1-x^2}}$
(D) $-\frac{1}{2}\sqrt{1-x^2}\,x^{\mathrm{Tan}^{-1}x}\left[\frac{\log x}{1+x^2} + \frac{\mathrm{Tan}^{-1}x}{x}\right]$

Answer: (D) $-\frac{1}{2}\sqrt{1-x^2}\,x^{\mathrm{Tan}^{-1}x}\left[\frac{\log x}{1+x^2} + \frac{\mathrm{Tan}^{-1}x}{x}\right]$ · The council's preliminary key

Q385 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

If $x = 3\cos t$ and $y = 4\sin t$, then $\frac{d^2y}{dx^2}$ at the point $(x_0, y_0) = \left(\frac{3}{2}\sqrt{2}, 2\sqrt{2}\right)$, is

(A) $\frac{4\sqrt{2}}{9}$
(B) $-\frac{4\sqrt{2}}{9}$
(C) $\frac{8\sqrt{2}}{9}$
(D) $-\frac{8\sqrt{2}}{9}$

Answer: (D) $-\frac{8\sqrt{2}}{9}$ · The council's preliminary key

Q386 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

If $y = \frac{2}{\sqrt{a^2-b^2}}\mathrm{Tan}^{-1}\left[\sqrt{\frac{a-b}{a+b}}\tan\frac{x}{2}\right]$, then $\left.\frac{d^2y}{dx^2}\right|_{x=\frac{\pi}{2}} =$

(A) $\frac{b}{2a^2}$
(B) $\frac{b}{a^2}$
(C) $\frac{2b}{a}$
(D) $\frac{b^2}{2a}$

Answer: (B) $\frac{b}{a^2}$ · The council's preliminary key

Q387 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

The constant 'c' of Lagrange's mean value theorem for the function $f(x) = \frac{2x+3}{4x-1}$ defind (sic) on $[1, 2]$ is

(A) $\frac{1+\sqrt{15}}{3}$
(B) $\frac{1+\sqrt{21}}{4}$
(C) $\frac{5}{3}$
(D) $\frac{3}{2}$

Answer: (B) $\frac{1+\sqrt{21}}{4}$ · The council's preliminary key

Q388 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

For $-1 < x < 1$, if $f(x) = \cos^2\left(\text{Tan}^{-1}\sqrt{\frac{1-x}{1+x}}\right)$ then $f'(x) =$

(A) $\frac{1}{2}$
(B) 1
(C) -1
(D) $\frac{-1}{2}$

Answer: (A) $\frac{1}{2}$ · The council's preliminary key

Q389 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

$y = \sin\left(\log\left(x^2+2x+1\right)\right) \Rightarrow (x+1)^2\frac{d^2y}{dx^2} + (x+1)\frac{dy}{dx} =$

(A) y
(B) $-4y$
(C) $4y$
(D) $-y$

Answer: (B) $-4y$ · The council's preliminary key

Q390 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

On the curve $y = x^3$, the point at which the tangent line is parallel to the chord joining the points $(-1, -1)$ and $(2, 8)$, is

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(A) $(1, -1)$
(B) $(2, 8)$
(C) $(1, 1)$
(D) $(3, 27)$

Answer: (C) $(1, 1)$ · The council's preliminary key

Q391 TS EAMCET 2017 · 12 May · Offline MCQ

Let $f : (-1, 1) \to \mathbb{R}$ be a differentiable function with $f(0) = -1$ and $f'(0) = 1$. If $g(x) = (f(2f(x) + 2))^2$, then $g'(0) =$

(A) 0
(B) -2
(C) 4
(D) -4

Answer: (D) -4 · The council's preliminary key

Q392 TS EAMCET 2017 · 12 May · Offline MCQ

If $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{-b^4}{a^2y^3}$
(B) $\frac{b^2}{ay^2}$
(C) $\frac{-b^3}{a^2y^3}$
(D) $\frac{b^3}{a^2y^2}$

Answer: (A) $\frac{-b^4}{a^2y^3}$ · The council's preliminary key

Q393 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

If $y = \tan^{-1}\left\{\frac{x}{1+\sqrt{1-x^2}}\right\} + \sin\left\{2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right\}$, then $\frac{dy}{dx} =$

(A) $\frac{2-x}{2\sqrt{1-x^2}}$
(B) $\frac{1-2x}{x\sqrt{1-x^2}}$
(C) $\frac{2x+1}{x\sqrt{1-x}}$
(D) $\frac{1-2x}{2\sqrt{1-x^2}}$

Answer: (D) $\frac{1-2x}{2\sqrt{1-x^2}}$ · The council's preliminary key

Q394 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

For $x^2-4\neq 0$, the value of $\frac{d}{dx}\left[\log\left\{e^x\left(\frac{x-2}{x+2}\right)^{3/4}\right\}\right]$ at $x=3$ is

(A) 1
(B) $\frac{8}{5}$
(C) 2
(D) $\frac{8e^3}{5}$

Answer: (B) $\frac{8}{5}$ · The council's preliminary key

Q395 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

If $y=\frac{\sinh^{-1}x}{\sqrt{1+x^2}}$ then $(1+x^2)y_2+3xy_1+y=$

(A) 0
(B) -1
(C) 1
(D) 2

Answer: (A) 0 · The council's preliminary key

Q396 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

For the function $f(x)=(x-1)(x-2)$ defined on $\left[0,\frac{1}{2}\right]$, the value of 'c' satisfying Lagrange's mean value theorem, is

(A) $\frac{1}{3}$
(B) $\frac{1}{5}$
(C) $\frac{1}{7}$
(D) $\frac{1}{4}$

Answer: (D) $\frac{1}{4}$ · The council's preliminary key

Q397 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

$y = \log\left(\frac{\sqrt{x^2+1}-x}{\sqrt{x^2+1}+x}\right) \Rightarrow \frac{dy}{dx} =$

(A) $\frac{1}{\sqrt{1+x^2}}$
(B) $\frac{2}{\sqrt{1+x^2}}$
(C) $\frac{-1}{\sqrt{1+x^2}}$
(D) $\frac{-2}{\sqrt{1+x^2}}$

Answer: (D) $\frac{-2}{\sqrt{1+x^2}}$ · The council's preliminary key

Q398 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

If $y = x\,\mathrm{Tan}^{-1}\left(\frac{x}{y}\right)$, then $\frac{dy}{dx} =$

(A) $\frac{xy^2}{x^2+y^2}$
(B) $\frac{xy}{x^2+y^2}$
(C) $\frac{y}{x}$
(D) $\frac{y}{x(x+y)}$

Answer: (C) $\frac{y}{x}$ · The council's preliminary key

Q399 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

If, for $a \neq 0$, $x = a(1-\sin t)$, $y = a(t+\cos t)$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{1-\sin t}{a\cos^2 t}$

(B) $\frac{1}{4a}\text{cosec}^4\left(\frac{t}{2}\right)$

(C) $\frac{\sin t-1}{a\cos^3 t}$

(D) $\frac{1}{4a}\sec^4\left(\frac{t}{2}\right)$

Answer: (C) $\frac{\sin t-1}{a\cos^3 t}$ · The council's preliminary key

Q400 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

If $f(x)=\text{Tan}^{-1}\left[\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right]$ for $0<|x|<1$ then $f'(x)=$

(A) $\frac{x}{\sqrt{1-x^2}}$

(B) $\frac{-x}{\sqrt{1-x^2}}$

(C) $\frac{x}{\sqrt{1-x^4}}$

(D) $\frac{-x}{\sqrt{1-x^4}}$

Answer: (D) $\frac{-x}{\sqrt{1-x^4}}$ · The council's preliminary key

Q401 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

If $y=a\cos(\log x)+b\sin(\log x)$ then $x^2y_2+xy_1=$

(A) 0

(B) y

(C) $2y$

(D) $-y$

Answer: (D) $-y$ · The council's preliminary key

Q402 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

If $x=a(\cos t+t\sin t)$, $y=a(\sin t-t\cos t)$ then $\sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}=$

(A) a

(B) at

(C) a^2t^2

(D) a^2t

Answer: (B) at · The council's preliminary key

Q403 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

The constant c of Rolle's theorem for the function $f(x)=(x-1)^3(x-2)^5$ in $[1,2]$ is

(A) $\frac{3}{2}$
(B) $\frac{11}{6}$
(C) $\frac{13}{8}$
(D) $\frac{11}{8}$

Answer: (D) $\frac{11}{8}$ · The council's preliminary key

Q404 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

If $y = \text{Tan}^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$ for $0 < |x| < 1$, then $\frac{dy}{dx} =$

(A) $\frac{x}{\sqrt{1-x^2}}$
(B) $\frac{x^2}{\sqrt{1-x^4}}$
(C) $\frac{\sqrt{1+x^2}}{\sqrt{1-x^4}}$
(D) $\frac{-x}{\sqrt{1-x^4}}$

Answer: (D) $\frac{-x}{\sqrt{1-x^4}}$ · The council's preliminary key

Q405 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

If $y = t^2 + t^3$ and $x = t - t^4$, then the value of $\frac{d^2y}{dx^2}$ at $t = 1$ is equal to

(A) $\frac{2}{3}$
(B) $\frac{-2}{3}$
(C) $\frac{4}{3}$
(D) $\frac{-4}{3}$

Answer: (D) $\frac{-4}{3}$ · The council's preliminary key

Q406 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

Suppose $f(x)$ is twice differentiable in the interval $[1, 3]$ and $f(1) = f(3)$. If $|f''(x)| \leq$ [clipped] then for all x in $[1, 3]$, which one of the following is true?

(A) $|f'(x)| \geq 1$
(B) $-4 < f'(x) < 4$
(C) $|f'(x)| > 2$
(D) $-3 \leq f'(x) \leq 3$

Answer: (B) $-4 < f'(x) < 4$ · The council's preliminary key

Q407 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

If $y = x^x + x^7 + 7^x + 7^7$, then $\frac{dy}{dx} =$

(A) $x \cdot x^{x-1} + 7x^6 + x7^{x-1}$

(B) $x^x(1 + \log_e x) + 7x^6 + 7^x(\log_e 7)$

(C) $x^x(1 + \log_e x) + 7x^6 + x \cdot 7^{x-1}$

(D) $x \cdot x^{x-1} \log_e x + 7x^6 + 7^x(\log_7 e)$

Answer: (B) $x^x(1 + \log_e x) + 7x^6 + 7^x(\log_e 7)$ · The council's preliminary key

Q408 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

The derivative of $e^{3x} \sin 4x$ with respect to x, is

(A) $5e^{3x} \sin\left(4x + \text{Tan}^{-1}\frac{4}{3}\right)$

(B) $5e^{3x} \sin\left(4x - \text{Tan}^{-1}\frac{4}{3}\right)$

(C) $5e^{3x} \sin\left(4x + \text{Tan}^{-1}\frac{3}{4}\right)$

(D) $5e^{3x} \sin\left(4x - \text{Tan}^{-1}\frac{3}{4}\right)$

Answer: (A) $5e^{3x} \sin\left(4x + \text{Tan}^{-1}\frac{4}{3}\right)$ · The council's preliminary key

Q409 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

$y = a\cos x + (b + 2x)\sin x \Rightarrow y'' + y =$

(A) $\cos x$

(B) $2\cos x$

(C) $3\cos x$

(D) $4\cos x$

Answer: (D) $4\cos x$ · The council's preliminary key

Q410 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

The value of c for which the Lagrange's mean value theorem is applicable for the function $f(x) = x(x + 3)(x - 2)$ in $[-1, 4]$, is

(A) $\frac{4}{3}$

(B) $\frac{8}{3}$

(C) 2

(D) $\frac{-8}{3}$

Answer: (C) 2 · The council's preliminary key

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Q411 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

If $ay^4 = (x+b)^5$, then $\dfrac{y \cdot \left(\dfrac{d^2y}{dx^2}\right)}{\left(\dfrac{dy}{dx}\right)^2} =$

(A) 5
(B) -5
(C) $\dfrac{1}{5}$
(D) $\dfrac{-1}{5}$

Answer: (C) $\dfrac{1}{5}$ · The council's preliminary key

Q412 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

$x^3 + y^3 = 3xy \Rightarrow \dfrac{dy}{dx} =$

(A) $\dfrac{y - x^2}{y^2 - x}$
(B) $\dfrac{y + x^2}{y^2 + x}$
(C) $\dfrac{y - x^2}{y^2 + x}$
(D) $\dfrac{y + x^2}{y^2 - x}$

Answer: (A) $\dfrac{y - x^2}{y^2 - x}$ · The council's preliminary key

Q413 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

If $y = \mathrm{Tan}^{-1}\left(\dfrac{2x}{1-x^2}\right)$, $|x| < 1$, then $\left(\dfrac{dy}{dx}\right)_{x=\frac{1}{2}} =$

(A) $\dfrac{1}{5}$
(B) $\dfrac{2}{5}$
(C) $\dfrac{4}{5}$
(D) $\dfrac{8}{5}$

Answer: (D) $\dfrac{8}{5}$ · The council's preliminary key

Q414 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

Lagrange's mean value theorem is not applicable in $[0, 1]$ to the function

(A) $f(x)=\begin{cases}\frac{1}{2}-x, & x<\frac{1}{2}\\ \left(\frac{1}{2}-x\right)^2, & x\geq\frac{1}{2}\end{cases}$

(B) $f(x)=\begin{cases}\frac{\sin x}{x}, & x\neq 0\\ 1, & x=0\end{cases}$

(C) $f(x)=x|x|$

(D) $f(x)=|x|$

Answer: (A) $f(x)=\begin{cases}\frac{1}{2}-x, & x<\frac{1}{2}\\ \left(\frac{1}{2}-x\right)^2, & x\geq\frac{1}{2}\end{cases}$ · The council's preliminary key

Q415 TS EAMCET 2016 · 15 May · Offline MCQ

If $y=\tan^{-1}\left[\frac{5\cos x-12\sin x}{12\cos x+5\sin x}\right]$, then $\frac{dy}{dx}=$

(A) 1

(B) -1

(C) -2

(D) $\frac{1}{2}$

Answer: (B) -1 · Official TGCHE final key

Q416 TS EAMCET 2016 · 15 May · Offline MCQ

$\frac{d}{dx}\tan^{-1}\left[\frac{\sqrt{1+\sin x}-\sqrt{1-\sin x}}{\sqrt{1+\sin x}+\sqrt{1-\sin x}}\right]=$

(A) 1

(B) $-\frac{1}{2}$

(C) $\frac{1}{2}$

(D) -1

Options (2) or (3) were accepted. More than one answer was accepted. · Official TGCHE final key

Q417 TS EAMCET 2016 · 15 May · Offline MCQ

If $y=a\cos(\sin 2x)+b\sin(\sin 2x)$, then $y''+(2\tan 2x)y'=$

(A) 0

(B) $4(\cos^2 2x)y$

(C) $-4(\cos^2 2x)y$

(D) $-(\cos^2 2x)y$

Answer: (C) $-4(\cos^2 2x)y$ · Official TGCHE final key

Q418 AP EAMCET 2016 · 29 Apr · Offline MCQ

If $y = \log_2(\log_2 x)$, then $\frac{dy}{dx} =$

(A) $\frac{\log_e 2}{x \log_e x}$

(B) $\frac{1}{\log_e (2x)^x}$

(C) $\frac{1}{(x \log_e x) \log_e 2}$

(D) $\frac{1}{x(\log_2 x)^2}$

Answer: (C) $\frac{1}{(x \log_e x) \log_e 2}$ · The council's preliminary key

Q419 AP EAMCET 2016 · 29 Apr · Offline MCQ

Suppose $f(x) = x(x+3)(x-2),\ x \in [-1, 4]$. Then a value of c in $(-1, 4)$ satisfying $f'(c) = 10$ is

(A) 2

(B) $\frac{5}{2}$

(C) 3

(D) $\frac{7}{2}$

Answer: (A) 2 · The council's preliminary key

Q420 AP EAMCET 2014 · 22 May · Offline MCQ

If $f(x) = x \tan^{-1} x$ then $\lim_{x \to 1} \frac{f(x) - f(1)}{x - 1} =$

(A) $\frac{\pi+3}{4}$

(B) $\frac{\pi}{4}$

(C) $\frac{\pi+1}{4}$

(D) $\frac{\pi+2}{4}$

Answer: (D) $\frac{\pi+2}{4}$ · The council's preliminary key

Q421 AP EAMCET 2014 · 22 May · Offline MCQ

$y = \tan^{-1}\left(\frac{\sqrt{1+a^2x^2}-1}{ax}\right) \Rightarrow (1+a^2x^2)y'' + 2a^2xy' =$

(A) $-2a^2$

(B) a^2

(C) $2a^2$

(D) 0

Answer: (D) 0 · The council's preliminary key

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Q422 AP EAMCET 2014 · 22 May · Offline MCQ

If $f(x)=\frac{x}{1+x}$ and $g(x)=f(f(x))$ then $g'(x)=$

(A) $\frac{1}{(2x+3)^2}$

(B) $\frac{1}{(x+1)^2}$

(C) $\frac{1}{x^2}$

(D) $\frac{1}{(2x+1)^2}$

Answer: (D) $\frac{1}{(2x+1)^2}$ · The council's preliminary key

Q423 AP EAMCET 2014 · 22 May · Offline MCQ

The value of c in the Lagrange's mean-value theorem for $f(x)=\sqrt{x-2}$ in the interval $[2,6]$ is

(A) $\frac{9}{2}$

(B) $\frac{5}{2}$

(C) 3

(D) 4

Answer: (C) 3 · The council's preliminary key

Q424 AP EAMCET 2013 · 10 May · Offline MCQ

$$f(x)=\frac{1}{1+\frac{1}{x}};\ g(x)=\frac{1}{1+\frac{1}{f(x)}}\Rightarrow g'(2)=$$

(A) $\frac{1}{5}$

(B) $\frac{1}{25}$

(C) 5

(D) $\frac{1}{16}$

Answer: (B) $\frac{1}{25}$ · The council's preliminary key

Q425 AP EAMCET 2013 · 10 May · Offline MCQ

$$\sqrt{\frac{y}{x}}+\sqrt{\frac{x}{y}}=2\Rightarrow\frac{dy}{dx}=$$

(A) $\dfrac{x^2+y^2}{x+y}$

(B) $\dfrac{x^2-y^2}{x+y}$

(C) 1

(D) 2

Answer: (C) 1 · The council's preliminary key

Q426 AP EAMCET 2013 · 10 May · Offline MCQ

$\dfrac{d}{dx}[(x+1)(x^2+1)(x^4+1)(x^8+1)] = (15x^p - 16x^q + 1)(x-1)^{-2} \Rightarrow (p,q) =$

(A) $(12,11)$

(B) $(15,14)$

(C) $(16,14)$

(D) $(16,15)$

Answer: (D) $(16,15)$ · The council's preliminary key

Q427 AP EAMCET 2013 · 10 May · Offline MCQ

$\cos^{-1}\left(\dfrac{y}{b}\right) = 2\log\left(\dfrac{x}{2}\right),\ x>0 \Rightarrow x^2\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} =$

(A) $4y$

(B) $-4y$

(C) 0

(D) $-8y$

Answer: (B) $-4y$ · The council's preliminary key

Q428 AP EAMCET 2013 · 10 May · Offline MCQ

$u = \log(x^3+y^3+z^3-3xyz) \Rightarrow (x+y+z)(u_x+u_y+u_z) =$

(A) 0

(B) $x-y+z$

(C) 2

(D) 3

Answer: (D) 3 · The council's preliminary key

Q429 AP EAMCET 2012 · 12 May · Offline MCQ

$f(x) = \log\left(e^x\left(\frac{x-2}{x+2}\right)^{3/4}\right) \Rightarrow f'(0) =$

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(A) $\frac{1}{4}$
(B) 4
(C) $\frac{-3}{4}$
(D) 1

Answer: (A) $\frac{1}{4}$ · Official APSCHE final key

Q430 AP EAMCET 2012 · 12 May · Offline MCQ

If $xy \neq 0$, $x + y \neq 0$ and $x^m y^n = (x + y)^{m+n}$ where $m, n \in \mathbb{N}$ then $\frac{dy}{dx} =$

(A) $\frac{y}{x}$
(B) $\frac{x+y}{xy}$
(C) xy
(D) $\frac{x}{y}$

Answer: (A) $\frac{y}{x}$ · Official APSCHE final key

Q431 AP EAMCET 2012 · 12 May · Offline MCQ

$x^2 + y^2 = t + \frac{1}{t}$, $x^4 + y^4 = t^2 + \frac{1}{t^2} \Rightarrow x^3 y \frac{dy}{dx} =$

(A) -1
(B) 1
(C) 0
(D) t

Answer: (A) -1 · Official APSCHE final key

Q432 AP EAMCET 2012 · 12 May · Offline MCQ

$f(x) = (x^2 - 1)^7 \Rightarrow f^{(14)}(x) =$

(A) 0
(B) 2!
(C) 7!
(D) 14!

Answer: (D) 14! · Official APSCHE final key

Q433 AP EAMCET 2012 · 12 May · Offline MCQ

If $u = f(r)$, where $r^2 = x^2 + y^2$ then $\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right) =$

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(A) $f''(r)$
(B) $f''(r)+f'(r)$
(C) $f''(r)+\frac{1}{r}f'(r)$
(D) $f''(r)+rf'(r)$

Answer: (C) $f''(r)+\frac{1}{r}f'(r)$ · Official APSCHE final key

Q434 AP EAMCET 2011 · 8 May · Offline MCQ

If $y=(1+x)(1+x^2)(1+x^4)\ldots\ldots(1+x^{2^n})$, then $\left(\frac{dy}{dx}\right)_{x=0}=$

(A) 0
(B) $\frac{1}{2}$
(C) 1
(D) 2

Answer: (C) 1 · The council's preliminary key

Q435 AP EAMCET 2011 · 8 May · Offline MCQ

If $\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right)=k$ (a constant), then $\frac{dy}{dx}=$

(A) $\frac{y}{x}$
(B) $\frac{x}{y}$
(C) $\frac{x^2}{y^2}$
(D) $\frac{y^2}{x^2}$

Answer: (A) $\frac{y}{x}$ · The council's preliminary key

Q436 AP EAMCET 2011 · 8 May · Offline MCQ

If $y=\frac{\log_e x}{x}$ and $z=\log_e x$, then $\frac{d^2y}{dz^2}+\frac{dy}{dz}=$

(A) e^{-z}
(B) $2e^{-z}$
(C) ze^{-z}
(D) $-e^{-z}$

Answer: (D) $-e^{-z}$ · The council's preliminary key

Q437 AP EAMCET 2011 · 8 May · Offline MCQ

If the distance s travelled by a particle in time t is given by $s=t^2-2t+5$, then its acceleration is

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (C) 2 · The council's preliminary key

Q438 AP EAMCET 2011 · 8 May · Offline MCQ

$u \equiv u(x,y) = \sin(y+ax) - (y+ax)^2 \Rightarrow$

(A) $u_{xx} = a^2 \cdot u_{yy}$
(B) $u_{yy} = a^2 u_{xx}$
(C) $u_{xx} = -a^2 \cdot u_{yy}$
(D) $u_{yy} = -a^2 u_{xx}$

Answer: (A) $u_{xx} = a^2 \cdot u_{yy}$ · The council's preliminary key

Q439 AP EAMCET 2010 · 30 May · Offline MCQ

$f(x) = (\cos x)(\cos 2x) \ldots\ldots\ldots (\cos nx) \Rightarrow f'(x) + \sum_{r=1}^{n} (r \tan rx)\, f(x) =$

(A) $f(x)$
(B) 0
(C) $-f(x)$
(D) $2f(x)$

Answer: (B) 0 · Official APSCHE final key

Q440 AP EAMCET 2010 · 30 May · Offline MCQ

$y = \cos^{-1}\left(\frac{a^2-x^2}{a^2+x^2}\right) + \sin^{-1}\left(\frac{2ax}{a^2+x^2}\right) \Rightarrow \frac{dy}{dx} =$

(A) $\frac{a}{x^2+a^2}$
(B) $\frac{2a}{x^2+a^2}$
(C) $\frac{4a}{x^2+a^2}$
(D) $\frac{a^2}{x^2+a^2}$

Answer: (C) $\frac{4a}{x^2+a^2}$ · Official APSCHE final key

Q441 AP EAMCET 2010 · 30 May · Offline MCQ

$f(x) = \sin x + \cos x \Rightarrow f\left(\frac{\pi}{4}\right) f^{(iv)}\left(\frac{\pi}{4}\right) =$

(A) 1
(B) 2
(C) 3
(D) 4

Answer: (B) 2 · Official APSCHE final key

Q442 AP EAMCET 2010 · 30 May · Offline MCQ

$y = \sin(m \sin^{-1} x) \Rightarrow (1 - x^2)y_2 - xy_1 =$ (Here y_n denotes $\frac{d^n y}{dx^n}$)

(A) $m^2 y$
(B) $-m^2 y$
(C) $2m^2 y$
(D) $-2m^2 y$

Answer: (B) $-m^2 y$ · Official APSCHE final key

Q443 AP EAMCET 2010 · 30 May · Offline MCQ

$u = \sin^{-1}\left(\frac{x^4 + y^4}{x + y}\right) \Rightarrow x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

(A) $3u$
(B) $4u$
(C) $3 \sin u$
(D) $3 \tan u$

Answer: (D) $3 \tan u$ · Official APSCHE final key

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