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MATHEMATICS · EAPCET (EAMCET)

Limits, Continuity & Differentiability

Previous Year Questions with answers

446 questions · **148** papers · **2010–2026** · newest paper first

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What is in this PDF: every Limits, Continuity & Differentiability 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.

Step-by-step solutions for every question are free in the EdLoop EAPCET app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

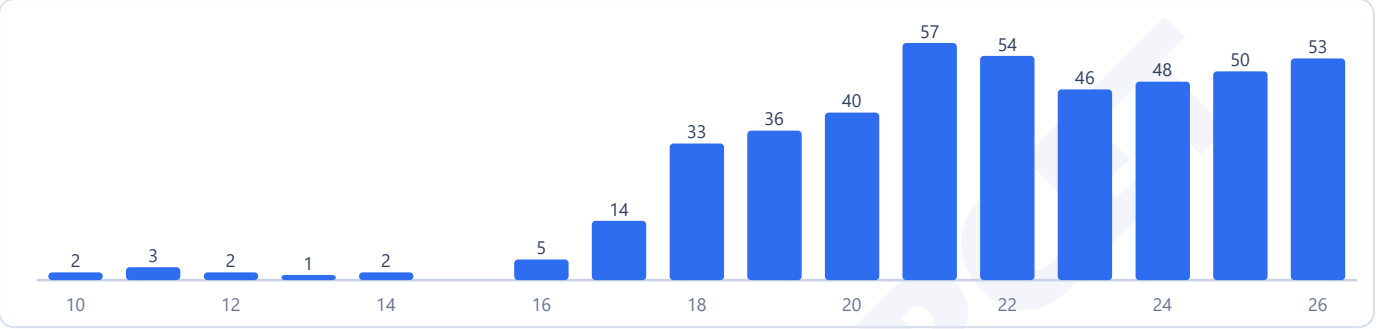
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Chapter at a glance

4.1%	446	77 of 77	446 / 0
of Mathematics questions, 2022–2026	questions, 2010–2026	papers asked it, 2022–2026	MCQ / numerical, 2010–2026

Trend. Steady: 3.3 questions per paper in 2024–2026 against 3.2 in 2022–2023.

Questions per year



Counts are the questions we hold: 446 in 148 papers. 6 questions in this chapter came back in more than one paper.

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

Limits	232
Continuity	128
Differentiability	86

How often it comes up

Limits, Continuity & Differentiability constitutes a major analytical foundation that appears without fail in every modern examination sitting. Across the aggregate historical timeframe from 2010 through 2026, the chapter accounted for 446 questions across 149 evaluated exam papers, appearing in 148 of those sittings to maintain an average of 3.0 questions per paper and a 3.7 percent subject share. In modern testing from 2022 to 2026, the topic maintained a perfect record, appearing in every single paper across all 77 sittings to supply 251 questions (recording an average of 3.3 questions per paper and a 4.1 percent subject share). This strong presence establishes the chapter at rank 11 among all 29 mathematics chapters.

Every paper in recent exam cycles includes between three and four calculus foundation problems. In the three most recent testing years from 2024 to 2026, candidates faced 151 questions across 46 sittings (present in all 46 papers, averaging 3.3 questions per test and a 4.1 percent share). During the older examination span from 2010 to 2021, examiners set 195 questions across 72 papers (present in 71 papers, averaging 2.7 per test and a 3.4 percent share). Looking across historical splits, comparing early testing with the last three years shows the share is up, while comparing recent testing with the last three years shows the share is about the same. Across individual state boards between 2022 and 2026, Andhra Pradesh sittings provided 178 questions across 48 papers (all 48 papers, 3.7 per test, 4.6 percent share), whereas Telangana sittings delivered 73 questions across 29 papers (all 29 papers, 2.5 per test, 3.1 percent share).

Most-asked topics

The chapter divides into three classic analysis components:

- **Limits**: Accounting for 232 total questions, with 133 emerging in recent examinations (tested through 2026). Coverage encompasses standard trigonometric and exponential limits, indeterminate forms zero over zero and

infinity over infinity, L'Hopital rule, one to the power infinity forms, rationalization, and asymptotic limits at infinity.

- **Continuity**: Delivering 128 total questions, with 65 set in modern papers (last asked in 2026). Key themes include left-hand and right-hand limit equality at branch points, finding unknown parameters for piecewise continuous functions, intermediate value theorem, and removable versus jump discontinuities.
- **Differentiability**: Supplying 86 total questions, with 53 appearing in recent cycles (tested up to 2026). Focus areas involve left-hand and right-hand derivative definitions, non-differentiable sharp corners in absolute value expressions, relation between continuity and differentiability, and differentiability of composite piecewise polynomials.

What the questions look like

Examiners test systematic application of limit expansion series, L'Hopital rule, and piecewise one-sided limit matching.

A staple problem presents an indeterminate trigonometric expression where candidates must balance powers of x across sines, tangents, and cosines to determine an unknown parameter k. Another ubiquitous format involves a piecewise function defined across three intervals with unknown coefficients a and b, asking students to establish continuity and differentiability across the interface boundaries. Differentiability problems routinely test functions containing products of polynomials and absolute values, requiring candidates to determine exactly which roots create sharp non-differentiable cusps versus which roots possess high multiplicity that smooths the corner into a differentiable point.

How to practise it

Master standard limits and Taylor series approximations. For limits as x approaches zero, remember that sin x approximates x minus x cubed over six, tan x approximates x plus x cubed over three, and cos x approximates one minus x squared over two. Using series expansions frequently evaluates limits in a single line, completely bypassing cumbersome repeated applications of L'Hopital rule.

For limits of the indeterminate form one to the power infinity, such as f of x raised to the power g of x where f approaches one and g approaches infinity, evaluate e raised to the limit of g of x times the quantity f of x minus one. When testing differentiability of absolute value expressions like modulus of x minus c times polynomial p of x, notice that the function is differentiable at x equals c if and only if p of c equals zero.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

$\lim_{x\to 0} \dfrac{x.2^x - x}{1-\cos x} =$

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

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

Q2 AP EAPCET 2026 · 18 May · Shift 1 MCQ

If $\lim_{x\to\infty}\left(1+\frac{a}{x}+\frac{b}{x^2}\right)^{2x} = e^2$, then $a =$

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

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

Q3 AP EAPCET 2026 · 18 May · Shift 1 MCQ

If f(x) defined by

$$f(x) = \begin{cases} \dfrac{1-\tan x}{4x-\pi}, & x \neq \dfrac{\pi}{4},\ x \in \left[0, \dfrac{\pi}{2}\right] \\ k, & x = \dfrac{\pi}{4} \end{cases}$$

is continuous in $\left[0, \dfrac{\pi}{2}\right]$, then $k =$

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

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

Q4 AP EAPCET 2026 · 18 May · Shift 2 MCQ

$$\lim_{x\to 0} \frac{e^{2x^2} - \cos 2x}{x^2} =$$

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(A) 2
(B) $\frac{5}{2}$
(C) 4
(D) 6

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

Q5 AP EAPCET 2026 · 18 May · Shift 2 MCQ

$$\lim_{x\to\infty} \frac{x^3 + 2x^2 \sin x - 4x\cos x}{\sqrt{(3x^2 + 2x\cos x)^3}} =$$

(A) $\frac{1}{\sqrt{3}}$
(B) $\frac{1}{9}$
(C) $\frac{1}{3\sqrt{3}}$
(D) $\frac{2}{3}$

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

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Q6 AP EAPCET 2026 · 18 May · Shift 2 MCQ

If the function $f(x) = \begin{cases} \frac{e^{a\sqrt{x-1}} - 1}{\sqrt{x^2-1}}, & \text{for } x > 1 \\ \sqrt{2}, & \text{for } x = 1 \\ \log\left(\frac{1+bx}{1-bx}\right)^{\frac{1}{\sqrt{2}x}}, & \text{for } 0 < x < 1 \end{cases}$ is continuous at $x = 1$, then

$\lim_{x\to a} \frac{x^2 - 5x + 6}{x - a} =$

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

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

Q7 AP EAPCET 2026 · 18 May · Shift 2 MCQ

If $f(x) = |x-2|\left(3^{4|x|} - 1\right)$ is a real valued function, then the set of points at which f is not differentiable, is

(A) $\{0\}$
(B) $\{2\}$
(C) $\{0, 2\}$
(D) $\emptyset$

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

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Q8 AP EAPCET 2026 · 15 May · Shift 1 MCQ

$$\lim_{x\to 2}(x^2-3x+3)^{\frac{1}{x^2-4}} =$$

(A) $e^{\frac{1}{2}}$
(B) 1
(C) 0
(D) $e^{\frac{1}{4}}$

Answer: (D) $e^{\frac{1}{4}}$ · The council's preliminary key

Q9 AP EAPCET 2026 · 15 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{x^2-4}{\sqrt{2-x}}, & \text{for } x<2\\ a, & \text{for } x=2\\ \log(x-2), & \text{for } x>2\end{cases}$

is a real valued function and 'a' is a finite real number, then

(A) f is continuous at $x=2$ when $a=0$
(B) f is left continuous at $x=2$ when $a=0$
(C) f is right continuous at $x=2$ when $a=\log 2$
(D) f is not continuous at $x=1$

Answer: (B) f is left continuous at $x=2$ when $a=0$ · The council's preliminary key

Q10 AP EAPCET 2026 · 15 May · Shift 1 MCQ

If $f(x)=\frac{\cos^4 x-1}{x^2}$, $x\neq 0$ and $f(0)=2$ is a real valued function, then

(A) $\lim_{x\to 0} f(x)$ does not exist
(B) $\lim_{x\to 0} f(x)=1$
(C) f is not continuous at $x=0$
(D) f is continuous at $x=0$

Answer: (C) f is not continuous at $x=0$ · The council's preliminary key

Q11 AP EAPCET 2026 · 15 May · Shift 2 MCQ

If $f(x)=\begin{cases}\left(\dfrac{2+3x^2}{2+5x^2}\right)^{\frac{8}{x^2}+3}, & \text{for } x\neq 0\\ k, & \text{for } x=0\end{cases}$ is a continuous function at $x=0$, then $k=$

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(A) e^{-2}
(B) e^{-4}
(C) e^{-8}
(D) e^{-16}

Answer: (C) e^{-8} · The council's preliminary key

Q12 AP EAPCET 2026 · 15 May · Shift 2 MCQ

$$\lim_{x\to\frac{\pi}{2}} \frac{\left(1-\tan\frac{x}{2}\right)(1-\sin x)}{\left(1+\tan\frac{x}{2}\right)(\pi-2x)^3} =$$

(A) 0
(B) $\frac{1}{8}$
(C) $\frac{1}{16}$
(D) $\frac{1}{32}$

Answer: (D) $\frac{1}{32}$ · The council's preliminary key

Q13 AP EAPCET 2026 · 15 May · Shift 2 MCQ

$$\lim_{x\to\infty}\left[x\left(\frac{1}{1+x}+\frac{1}{(1+x)(1+2x)}+\frac{1}{(1+2x)(1+3x)}+\cdots+\frac{1}{(1+(n-1)x)(1+nx)}\right)\right] =$$

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

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

Q14 AP EAPCET 2026 · 14 May · Shift 1 MCQ

$\lim_{x\to e} \frac{\log x - 1}{x-e} =$

(A) 1
(B) $\frac{1}{2}$
(C) $\frac{1}{e}$
(D) Does not exist

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

Q15 AP EAPCET 2026 · 14 May · Shift 1 MCQ

$$\lim_{x\to\frac{\pi}{3}} \frac{\tan^3 x - 3\tan x}{\cos\left(x+\frac{\pi}{6}\right)} =$$

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(A) 12
(B) 24
(C) -24
(D) -12

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

Q16 AP EAPCET 2026 · 14 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{\sqrt{2+\cos x}-1}{(\pi-x)^2}, & x\neq\pi\\ k, & x=\pi\end{cases}$ is continuous at $x=\pi$, then $k=$

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

Answer: (D) $\dfrac{1}{4}$ · The council's preliminary key

Q17 AP EAPCET 2026 · 14 May · Shift 1 MCQ

The set of all the points at which $f(x)=|2-|x||$ is continuous but not differentiable is

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

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

Q18 AP EAPCET 2026 · 14 May · Shift 2 MCQ

The number of points of discontinuity of the function $f(x)=[x]+|x-2|$, $-3<x<3$ is

(A) 5
(B) 3
(C) 4
(D) 2

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

Q19 AP EAPCET 2026 · 14 May · Shift 2 MCQ

If $\lim_{x\to\infty}\frac{(ax^2+bx+c)}{(lx^2+mx+n)}\frac{(lx-1)^{\frac{x}{2}}}{(lx+a)^{\frac{x}{2}}}=\frac{3}{\sqrt{16e}}$, then $\lim_{x\to 0}\frac{l+mx+cx^2}{a+bx+nx^2}=$

(A) $\frac{3}{4}$
(B) $\frac{4}{3}$
(C) $\frac{5}{4}$
(D) $\frac{4}{5}$

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

Q20 AP EAPCET 2026 · 14 May · Shift 2 MCQ

$$\lim_{n\to\infty}\frac{1+2^4+3^4+\cdots+n^4}{n^5}-\lim_{n\to\infty}\frac{1+2^3+3^3+\cdots+n^3}{n^5}=$$

(A) $\frac{1}{5}$
(B) $\frac{1}{4}$
(C) $\frac{1}{20}$
(D) 0

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

Q21 AP EAPCET 2026 · 13 May · Shift 1 MCQ

If $\lim_{n\to5^-}\left(\frac{[n]}{2}\right)^3-\left(\frac{[n]^3}{2^4}\right)=k$, then $\lim_{n\to k^+}\left(\frac{[n]}{2}\right)^3-\left(\frac{[n]^3}{2^4}\right)=$

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

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

Q22 AP EAPCET 2026 · 13 May · Shift 1 MCQ

$$\lim_{x\to1}\frac{(9x-1)(\sqrt{x}-1)}{3x^2+2x-5}=$$

(A) $\frac{1}{2}$
(B) $\frac{3}{5}$
(C) 2
(D) $-\frac{1}{2}$

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

Q23 AP EAPCET 2026 · 13 May · Shift 1 MCQ

If the function $f(x)=\begin{cases}\frac{2h(x)-g(x)}{(h(x)+7)^{2/3}}, & x\neq0\\ \frac{7}{4}, & x=0\end{cases}$ is continuous at $x=0$ and $\lim_{x\to0}h(x)=1$, then $\lim_{x\to0}g(x)=$

(A) 4
(B) 3
(C) -5
(D) 7

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

Q24 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Let $[y]$ represent the greatest integer less than or equal to y. Then set of all x at which $f(x) = \text{Cos}^{-1}[4x+3]$ is differentiable is

(A) $\mathbb{R}$
(B) $[-1, 1]$
(C) $\left[-1, \frac{-1}{4}\right) - \left\{\frac{-3}{4}, \frac{-1}{2}\right\}$
(D) $\left(\frac{-3}{4}, \infty\right)$

Answer: (C) $\left[-1, \frac{-1}{4}\right) - \left\{\frac{-3}{4}, \frac{-1}{2}\right\}$ · The council's preliminary key

Q25 AP EAPCET 2026 · 13 May · Shift 1 MCQ

If $f(x) = \begin{cases} \dfrac{1-\sin^3 x}{3\cos^2 x}, & x \neq \pi/2 \\ \dfrac{1}{2}, & x = \pi/2 \end{cases}$, then $f'(\pi/2) =$

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

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

Q26 AP EAPCET 2026 · 13 May · Shift 2 MCQ

$$\lim_{x\to 0} \frac{8^x - 4^x - 2^x + 1}{\sqrt{3} - \sqrt{2+\cos x}} =$$

(A) $2\sqrt{3}(\log 2)^2$
(B) $4\sqrt{3}(\log 2)^2$
(C) $6\sqrt{3}(\log 2)^2$
(D) $8\sqrt{3}(\log 2)^2$

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

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Q27 AP EAPCET 2026 · 13 May · Shift 2 MCQ

If $y = f(x)$ is a fucntion such that $f'(2) = 6, f'(1) = 4$, then

$$\lim_{h\to 0} \frac{f(2h+2+h^2) - f(2)}{f(h-h^2+1) - f(1)} =$$

(A) $\frac{3}{2}$
(B) 2
(C) $\frac{5}{2}$
(D) 3

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

Q28 AP EAPCET 2026 · 13 May · Shift 2 MCQ

$$\lim_{x\to 0} \left(\frac{a^x + b^x}{2}\right)^{\frac{1}{x}} =$$

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

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

Q29 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If $\lim_{x\to 0} \frac{\tan ax - \sin ax}{3\sin 2x - \sin 6x} = 1$, then $\lim_{x\to a} \frac{\log(x-3)}{x-a} =$

(A) 1
(B) 2
(C) 3
(D) 4

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

Q30 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If a function

$$f(x) = \begin{cases} \frac{2^{\sin^2 x} - \cos bx}{\tan^2 x}, & \text{for } -\frac{\pi}{2} < x < 0 \\ 2, & \text{for } x = 0 \\ \frac{\sin^2 ax - \sin^2 bx}{1 - \cos x}, & \text{for } 0 < x < \frac{\pi}{2} \end{cases}$$

is continuous at $x = 0$, then $a^2 + b^2 =$

(A) 9
(B) $9 - \log 16$
(C) $9 - \log 8$
(D) 1

Answer: (B) $9 - \log 16$ · The council's preliminary key

Q31 AP EAPCET 2026 · 12 May · Shift 1 MCQ

$\lim_{x\to 0}(\cos 2x)^{\tan x} =$

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

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

Q32 AP EAPCET 2026 · 12 May · Shift 2 MCQ

If $\lim_{x\to 0} \dfrac{\sin^2 3x \ \tan^4 5x}{x^3 \sin^3 kx} = \dfrac{5}{3}$, then $k =$

(A) 15
(B) 12
(C) 25
(D) 27

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

Q33 AP EAPCET 2026 · 12 May · Shift 2 MCQ

$$\lim_{x\to 0} \frac{e^{3x} - (1+x)e^x}{e^{2x} - 1} =$$

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

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

Q34 AP EAPCET 2026 · 12 May · Shift 2 MCQ

If a function $f(x) = \begin{cases} \dfrac{x}{|x|} - K, & x > 0 \\ \dfrac{x}{|x|} + L, & x < 0 \\ 5, & x = 0 \end{cases}$ is continuous for all real values of x, then $\dfrac{L+K}{L-K} =$

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(A) 5
(B) 3
(C) $\frac{1}{5}$
(D) $\frac{1}{3}$

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

Q35 AP EAPCET 2026 · 12 May · Shift 2 MCQ

A function $f : \mathbb{R} \to \mathbb{R}$ defined as

$$f(x) = \begin{cases} \frac{x}{|x|}, & x < -2 \\ \frac{x|x|}{4}, & -2 \le x \le 2 \\ \frac{|x|}{x}, & x > 2 \end{cases}$$

is

(A) Differentiable for all real x
(B) Differentiable for all real x except for $x = -2, 0, 2$
(C) Continuous for all real x and differentiable for all real x except for $x = -2, 2$
(D) Continuous for all real x except for $x = 0, -2, 2$ and differentiable at $x = -2, 0, 2$

Answer: (C) Continuous for all real x and differentiable for all real x except for $x = -2, 2$ · The council's preliminary key

Q36 AP EAPCET 2026 · 12 May · Shift 2 MCQ

$$\lim_{x \to e} \frac{(\log x)^{\tan x} - 1}{x - e} =$$

(A) $\frac{\tan e}{e}$
(B) $\frac{1}{\tan e}$
(C) $\frac{1}{e}$
(D) $\frac{e}{\tan e}$

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

Q37 TS EAPCET 2026 · 11 May · Shift 1 MCQ

$$\lim_{x \to 0} \frac{\log(4 + x)^x - \log 4^x}{\sin^2 x} =$$

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

Answer: (B) $\frac{1}{4}$ · The council's preliminary key

Q38 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If a function $f:(-\infty,2)\to \mathrm{R}$ defined by $f(x)=\begin{cases}\frac{\alpha|x^2-3x+2|}{(x-1)}, & \text{if } x<1\\ \frac{\sin([x]-x)}{x-[x]}, & \text{if } x>1\\ \beta, & \text{if } x=1\end{cases}$ is continuous at $x=1$, then $\frac{\alpha^2+\beta^2}{|\alpha\beta|}=$

(A) 2
(B) $\frac{25}{12}$
(C) $\frac{5}{2}$
(D) 3

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

Q39 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If a function $f(x)=\begin{cases}\frac{a}{|x|} & \text{when } x\le -1 \text{ or } x\ge 1\\ x^2+b & \text{when } -1<x<1\end{cases}$ is differentiable on R, then $a+b=$

(A) 3
(B) -2
(C) -5
(D) 2

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

Q40 TS EAPCET 2026 · 11 May · Shift 2 MCQ

$$\lim_{x\to 0}\frac{2^{\tan x}-2^{\sin x}}{x^2\sin x}=k$$

, then $e^{2k}=$

(A) 1

(B) $\log 2$

(C) 2

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

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

Q41 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If a function $f:[1,7]\to \mathrm{R}$ is defined as $f(x)=\begin{cases}2x^2-1, & x\le\sqrt{7}\\ \sqrt{7}x+6, & \sqrt{7}<x<5\\ \sin\pi x, & 5\le x\le 6\\ x-[x], & 6<x\le 7\end{cases}$

Then the number of points of discontinuity in $[1,7]$ is

(A) 4

(B) 3

(C) 2

(D) 1

Answer: (C) 2 · Checked by our team

Q42 TS EAPCET 2026 · 11 May · Shift 2 MCQ

Let $f(x)=\begin{cases}-150-25x, & -10\le x\le -5\\ x|x|, & -5\le x\le 5\\ 150-25x, & 5\le x\le 10\end{cases}$ be a function

Which of the following is correct?

(A) $f(x)$ is continuous at all points except at $x=\pm 5$

(B) $f(x)$ is differentiable at all points except at $x=\pm 5$

(C) $f(x)$ is not differentiable at $x=0$ since $|x|$ is not differentiable at $x=0$

(D) $f(x)$ has 4 points of discontinuity

Answer: (B) $f(x)$ is differentiable at all points except at $x=\pm 5$ · The council's preliminary key

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Q43 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If a and b are non-negative real numbers and $\lim_{x\to 0}\dfrac{e^{ax}-\cos bx}{1-\cos x}=4$, then $\lim_{x\to a}\dfrac{\sin(bx-ab)}{(x-a)}=$

(A) 1
(B) 2
(C) 4
(D) 8

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

Q44 TS EAPCET 2026 · 10 May · Shift 1 MCQ

If the function $f(x)=\begin{cases}\dfrac{\sin x-\tan x}{x^3} & ,\text{if } -\dfrac{\pi}{2}<x<0\\ a & ,\text{if } x=0\\ \dfrac{\sin(b-3)x+\sin bx}{\sin x} & ,\text{if } 0<x<\dfrac{\pi}{2}\end{cases}$ is continuous in $\left(-\dfrac{\pi}{2},\dfrac{\pi}{2}\right)$, then $a+2b=$

(A) 1
(B) 2
(C) $\frac{3}{2}$
(D) $\frac{5}{4}$

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

Q45 TS EAPCET 2026 · 10 May · Shift 2 MCQ

$$\lim_{x\to\frac{2}{3}}\frac{\sin\left(\pi\cos^2(3x-2)\right)}{9x^2-12x+4}=$$

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

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

Q46 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If the function $f(x)=\begin{cases}\dfrac{\sin^2 ax-\sin^2 bx}{x^2}, & x<0\\ b, & x=0\\ \dfrac{(x+2x^2)^{1/5}-x^{1/5}}{\sin^{6/5}x}, & 0<x<\pi\end{cases}$ is continuous at $x=0$, then $a^2+b=$

(A) 2
(B) 4
(C) $\frac{2}{5}$
(D) $\frac{24}{25}$

Answer: (D) $\frac{24}{25}$ · The council's preliminary key

Q47 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If $f(x) = \begin{cases} \frac{x}{|x|} & \text{when } x \neq 0 \\ |x| & \text{when } x = 0 \end{cases}$ is a real valued function, then

(A) f is continuous but not differentiable at $x = 0$
(B) f is both continuous and differentiable at $x = 0$
(C) f is not defined at $x = 0$
(D) f is neither continuous nor differentiable at $x = 0$

Answer: (D) f is neither continuous nor differentiable at $x = 0$ · The council's preliminary key

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Q48 TS EAPCET 2026 · 9 May · Shift 1 MCQ

$[y]$ represents the greatest integer less than or equal to y and $\{y\}$ represents the fractional part (or decimal part) of y. If

$$\lim_{x \to 0^+} \left([1-x] + \frac{\alpha^{2[1-x]+\{1-x\}} + [1-x] - 1}{2[1-x] + \{1-x\}} \right) = 11,$$

then $\alpha =$

(A) 10
(B) -11
(C) 12
(D) -9

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

Q49 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If $f(x) = \frac{\lambda e^{\frac{1}{|x|}} + 3e^{\frac{-1}{x}}}{(\lambda+2)e^{\frac{1}{|x|}} - e^{\frac{-1}{x}}}$ for $x \neq 0$ and $f(0) = k$, $k \in R$ is a continuous function at $x = 0$, then $2\lambda =$

(A) $5f(0)$
(B) $f(0)$
(C) $-f(0)$
(D) $\frac{f(0)}{2}$

Answer: (B) $f(0)$ · The council's preliminary key

Q50 TS EAPCET 2026 · 9 May · Shift 1 MCQ

$f(x)$ is an n^{th} degree polynomial and $\alpha_1, \alpha_2, ..., \alpha_n$ are distinct n zeros of $f(x)$.

$g(x)$ is a polynomial having three zeros common with the zeros of $f(x)$.

Assertion (A) : $|f(x)|g(x)$ is continuous and differentiable at all α_i's.

Reason (R) : $\underset{x\to a}{\text{Lt}} \frac{|x-a|}{x-a}$ does not exist and $\underset{x\to a}{\text{Lt}} |x-a| = 0$

The correct answer is

(A) Both (A) and (R) are correct, (R) is the correct explanation of (A)
(B) Both (A) and (R) are correct, (R) is not the correct explanation of (A)
(C) (A) is correct, but (R) is not correct
(D) (A) is not correct, but (R) is correct

Answer: (D) (A) is not correct, but (R) is correct · The council's preliminary key

Q51 TS EAPCET 2026 · 9 May · Shift 2 MCQ

Let $f(x) = \frac{([x]+|x|-x)x}{\sin|x|}$ be a real valued function. If $\alpha = \lim_{x\to 0^-} f(x)$ and $\beta = \lim_{x\to 0^+} f(x)$ then

(A) $\alpha = \beta$
(B) $\alpha - \beta = 1$
(C) $\alpha + \beta = 3$
(D) $\alpha\beta = 1$

Answer: (B) $\alpha - \beta = 1$ · The council's preliminary key

Q52 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If the function $f(x) = \begin{cases} \frac{p(1+\sin 3x)}{(\pi+6x)^2}, & \text{if } -\frac{\pi}{2} < x < -\frac{\pi}{6} \\ \cos 2x, & \text{if } x = -\frac{\pi}{6} \\ \frac{q(\sin 12x + 2\sin 6x)}{\cos^3\left(\frac{\pi+12x}{2}\right)}, & \text{if } -\frac{\pi}{6} < x < 0 \end{cases}$ is continuous at $x = -\frac{\pi}{6}$, then

$p + 2q =$

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

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

Q53 TS EAPCET 2026 · 9 May · Shift 2 MCQ

The domain of the derivative of the real valued function $f(x) = (x^2 - x - 2)\left|x^2 + x - 6\right|$ is

(A) $\mathbb{R}$
(B) $\mathbb{R} - \{-3\}$
(C) $\mathbb{R} - \{-3, 2\}$
(D) $\mathbb{R} - \{-3, -1, 2\}$

Answer: (B) $\mathbb{R} - \{-3\}$ · The council's preliminary key

Q54 AP EAPCET 2025 · 27 May · Shift 1 MCQ

$$\lim_{x \to \frac{\pi}{4}} \frac{2\sqrt{2} - (\cos x + \sin x)^3}{1 - \sin 2x} =$$

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

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

Q55 AP EAPCET 2025 · 27 May · Shift 1 MCQ

Let $[x]$ denote the greatest integer less than or equal to x. Then

$$\lim_{x \to 2^+} \left(\frac{[x]^3}{3} - \left[\frac{x}{3}\right]^3 \right) =$$

(A) 0
(B) $\frac{8}{3}$
(C) $\frac{64}{27}$
(D) $\frac{1}{3}$

Answer: (B) $\frac{8}{3}$ · The council's preliminary key

Q56 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If the function f defined by

$$f(x)=\begin{cases}\dfrac{1-\cos 4x}{x^2}, & x<0\\ a, & x=0\\ \dfrac{\sqrt{x}}{\sqrt{16+\sqrt{x}}-4}, & x>0\end{cases}$$

is continuous at $x=0$, then $a=$

(A) 1
(B) 2
(C) 4
(D) 8

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

Q57 AP EAPCET 2025 · 27 May · Shift 1 MCQ

The domain of the derivative of the function $f(x)=\dfrac{x}{1+|x|}$ is

(A) $[0,\infty)$
(B) $(-\infty,0)$
(C) $(-\infty,\infty)$
(D) $(0,\infty)$

Answer: (C) $(-\infty,\infty)$ · The council's preliminary key

Q58 AP EAPCET 2025 · 26 May · Shift 1 MCQ

$\lim_{x\to\infty}[x-\log(\cosh x)]=$

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

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

Q59 AP EAPCET 2025 · 26 May · Shift 1 MCQ

$$\lim_{x\to\infty}\left(\sqrt[3]{x^3+4x^2}-\sqrt{x^2-3x}\right)=$$

(A) $\frac{17}{6}$
(B) $\frac{25}{6}$
(C) $-\frac{1}{6}$
(D) $\frac{37}{6}$

Answer: (A) $\frac{17}{6}$ · The council's preliminary key

Q60 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If a real valued function $f(x)=\begin{cases} e^{\frac{\sin a(x-[x])}{x-[x]}}, & \text{if } x<1 \\ b+1, & \text{if } x=1 \\ \frac{|x^2+x-2|}{x-1}, & \text{if } x>1 \end{cases}$ is continuous at $x=1$, then $b\sin a=$

($[x]$ denotes the greatest integer function)

(A) 6

(B) 4

(C) $\log_e 9$

(D) $\log_e 2$

Answer: (C) $\log_e 9$ · The council's preliminary key

Q61 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If $f(x)=2+\left|\sin^{-1}x\right|$ and $A=\{x\in R/f^1(x) \text{ exists}\}$, then $A=$

(A) $\{0\}$

(B) $[-1,1]$

(C) $(-\infty,-1)\cup(1,\infty)$

(D) $(-1,0)\cup(0,1)$

Answer: (D) $(-1,0)\cup(0,1)$ · The council's preliminary key

Q62 AP EAPCET 2025 · 26 May · Shift 2 MCQ

$$\lim_{x\to 0}\frac{x+2\sin x+3\tan x-\tan^3 x}{\sqrt{x^2+2\sin x+\tan x+3}-\sqrt{\sin^2 x-2\tan x-x+3}}=$$

(A) $2\sqrt{3}$

(B) 10

(C) 25

(D) $\sqrt{17}$

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

Q63 AP EAPCET 2025 · 26 May · Shift 2 MCQ

$$\lim_{x\to\infty}\frac{(3-x)^{25}(6+x)^{35}}{(12+x)^{38}(9-x)^{22}}=$$

(A) 3^{60}

(B) -1

(C) 1

(D) 0

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

Q64 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If a real valued function

$$f(x)=\begin{cases}\log(1+[x]), & x\geq 0\\ \sin^{-1}[x], & -1\leq x<0\\ k([x]+|x|), & x<-1\end{cases}$$

is continuous at $x=-1$, then $k=$

(A) $-\pi/2$
(B) $-\pi$
(C) π
(D) $\pi/2$

Answer: (D) $\pi/2$ · The council's preliminary key

Q65 AP EAPCET 2025 · 24 May · Shift 1 MCQ

$[x]$ represents the greatest integer function.

If $\lim_{x\to 0^+}\frac{\cos[x]-\cos(kx-[x])}{x^2}=5$ then $k=$

(A) $\sqrt{10}$
(B) $\sqrt{11}$
(C) 3
(D) 9

Answer: (A) $\sqrt{10}$ · The council's preliminary key

Q66 AP EAPCET 2025 · 24 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{x\tan 2x-2x\tan x}{(1-\cos 2x)^2}=$$

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

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

Q67 AP EAPCET 2025 · 24 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{(e^{ax}-1)\log(1+x)}{\sin^2 x}, & \text{if } x>0\\ 2, & \text{if } x=0\\ \dfrac{\cos 4x-\cos bx}{\tan^2 x}, & \text{if } x<0\end{cases}$ is continuous at $x=0$ then $\sqrt{b^2-a^2}=$

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(A) 4
(B) 5
(C) 3
(D) 7

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

Q68 AP EAPCET 2025 · 23 May · Shift 1 MCQ

The quadratic equation whose roots are

$$l = \lim_{\theta \to 0}\left(\frac{3\sin\theta - 4\sin^3\theta}{\theta}\right) \text{ and } m = \lim_{\theta \to 0}\left(\frac{2\tan\theta}{\theta(1-\tan^2\theta)}\right)$$

is

(A) $x^2 + 5x + 6 = 0$
(B) $x^2 - 5x + 6 = 0$
(C) $x^2 - 5x - 6 = 0$
(D) $x^2 + 5x - 6 = 0$

Answer: (B) $x^2 - 5x + 6 = 0$ · The council's preliminary key

Q69 AP EAPCET 2025 · 23 May · Shift 1 MCQ

$$\lim_{x \to \infty} \frac{3x + 4\cos^2 x}{\sqrt{x^2 - 5\sin^2 x}} =$$

(A) $\frac{3}{5}$
(B) $\frac{4}{5}$
(C) 3
(D) 1

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

Q70 AP EAPCET 2025 · 23 May · Shift 1 MCQ

If a function $f(x) = \begin{cases} \dfrac{\sqrt[3]{1+ax^2+bx^3} - \sqrt[3]{1-ax^2-bx^3}}{x^2}, & x < 0 \\ 5, & x = 0 \\ \dfrac{\tan 3x - \sin 3x}{bx^3}, & x > 0 \end{cases}$ is continuous at $x = 0$, then the geometric mean of a and b is

(A) $\frac{3}{2}$
(B) $\frac{9}{2}$
(C) $\frac{81}{4}$
(D) $\frac{9}{4}$

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

Q71 AP EAPCET 2025 · 23 May · Shift 2 MCQ

$$\lim_{x\to 0}\frac{x^2\sin^2(3x)+\sin^4(6x)}{(1-\cos 3x)^2}=$$

(A) $\frac{580}{9}$
(B) $\frac{145}{3}$
(C) $\frac{580}{3}$
(D) $\frac{145}{9}$

Answer: (A) $\frac{580}{9}$ · The council's preliminary key

Q72 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If a real valued function $f(x)=\begin{cases}(1+\sin x)^{\operatorname{cosec} x}, & -\pi/2<x<0\\ a, & x=0\\ \dfrac{e^{2/x}+e^{3/x}}{ae^{2/x}+be^{3/x}}, & 0<x<\pi/2\end{cases}$ is continuous at $x=0$, then $ab=$

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

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

Q73 AP EAPCET 2025 · 23 May · Shift 2 MCQ

$$\lim_{x\to 0}\frac{(\operatorname{cosec} x-\cot x)(e^x-e^{-x})}{\sqrt{3}-\sqrt{2+\cos x}}=$$

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

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

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Q74 AP EAPCET 2025 · 22 May · Shift 1 MCQ

$$\lim_{y\to 0}\frac{\sqrt{1+\sqrt{1+y^4}}-\sqrt{2}}{y^4}=$$

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

Answer: (A) $\frac{1}{4\sqrt{2}}$ · The council's preliminary key

Q75 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If $\lim_{x\to 0}\frac{\cos 2x-\cos 4x}{1-\cos 2x}=k$, then $\lim_{x\to k}\frac{x^k-27}{x^{k+1}-81}=$

(A) 0
(B) 1
(C) $\frac{1}{2}$
(D) $\frac{1}{4}$

Answer: (D) $\frac{1}{4}$ · The council's preliminary key

Q76 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If the function $f(x)=\begin{cases}1+\cos x, & x\le 0\\ a-x, & 0<x\le 2\\ x^2-b^2, & x>2\end{cases}$ is continuous everywhere, then $a^2+b^2=$

(A) 4
(B) 8
(C) 6
(D) 12

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

Q77 AP EAPCET 2025 · 22 May · Shift 1 MCQ

Assertion (A) : If $y=f(x)=(|x|-|x-1|)^2$, then $\left(\frac{dy}{dx}\right)_{x=1}=1$

Reason (R) : If $\lim_{x\to a}\frac{f(x)-f(a)}{x-a}$ exist, then it is called derivative of $f(x)$ at $x=a$.

Then

(A) (A) is true, (R) is true, (R) is correct explanation to (A)

(B) (A) is true, (R) is true, (R) is not the 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 · The council's preliminary key

Q78 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If $y = |\cos x - \sin x| + |\tan x - \cot x|$, then $\left(\frac{dy}{dx}\right)_{x=\frac{\pi}{3}} + \left(\frac{dy}{dx}\right)_{x=\frac{\pi}{6}} =$

(A) 1

(B) -1

(C) 2

(D) 0

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

Q79 AP EAPCET 2025 · 22 May · Shift 2 MCQ

$[x]$ denotes the greatest integer less than or equal to x. If $\{x\} = x - [x]$ and

$$\lim_{x \to 0^-} \frac{\text{Sin}^{-1}(x + [x])}{2 - \{x\}} = \theta,$$

then $\sin\theta + \cos\theta =$

(A) -1

(B) 0

(C) 1

(D) $\sqrt{2}$

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

Q80 AP EAPCET 2025 · 22 May · Shift 2 MCQ

$\lim_{n\to\infty} \frac{1}{n^3} \sum_{k=1}^{n} k^2 x =$

(A) x

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

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

(D) $\frac{x}{4}$

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

Q81 AP EAPCET 2025 · 22 May · Shift 2 MCQ

Let $f : \mathbb{R} \to \mathbb{R}$ be defined by

$$f(x)=\begin{cases} a-\dfrac{\sin[x-1]}{x-1}, & \text{if } x>1 \\ 1, & \text{if } x=1 \\ b-\left[\dfrac{\sin[x-1]-[x-1]}{([x-1])^3}\right], & \text{if } x<1 \end{cases}$$

where $[t]$ denotes the greatest integer less than or equal to t. If f is continuous at $x=1$, then $a+b=$

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

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

Q82 AP EAPCET 2025 · 21 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{(\sqrt{2})-\sqrt{1+\cos x}}{\sqrt{15+\cos 2x}-4}=$$

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

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

Q83 AP EAPCET 2025 · 21 May · Shift 1 MCQ

If a real valued function

$$f(x)=\begin{cases} \dfrac{x^2+(a+3)x+(a+1)}{x+3}, & \text{when } x\neq -3 \\ -\dfrac{5}{2}, & \text{when } x=-3 \end{cases}$$

is continuous at $x=-3$, then $\lim_{x\to a}\left(x^2+x+1\right)=$

(A) $\frac{7}{4}$
(B) $\frac{5}{2}$
(C) $\frac{4}{7}$
(D) $\frac{2}{5}$

Answer: (A) $\frac{7}{4}$ · The council's preliminary key

Q84 AP EAPCET 2025 · 21 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{x\tan 2x-2x\tan x}{(1-\cos 3x)(\operatorname{cosec} x-\cot x)^2}=$$

(A) $\frac{4}{9}$
(B) $\frac{8}{9}$
(C) $\frac{16}{9}$
(D) $\frac{32}{9}$

Answer: (C) $\frac{16}{9}$ · The council's preliminary key

Q85 AP EAPCET 2025 · 21 May · Shift 1 MCQ

Match the functions in Column I with their properties in Column II. In the following $[x]$ denotes the greatest integer less than or equal to x

Column I	Column II
A) $x\|x\|$	I. Strictly increasing and continuous in $(-1,1)$
B) $\sqrt{\|x\|}$	II. Continuous but not differentiable in $(-1,1)$
C) $x+[x]$	III. Differentiable in $(-1,1)$
D) $\|x-1\|+\|x+1\|+\|x\|$	IV. Differentiable in $(-1,0)\cup(0,1)$
	V. Strictly increasing and not differentiable in $(-1,1)$

The correct match is

(A) A-III, B-V, C-II, D-I
(B) A-II, B-III, C-I, D-V
(C) A-I, B-II, C-V, D-IV
(D) A-IV, B-I, C-V, D-III

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

Q86 AP EAPCET 2025 · 21 May · Shift 2 MCQ

$$\lim_{x\to-\infty}\frac{5x^3-x^2\sin 5x}{x\cos 4x+7|x|^3-4|x|+3}=$$

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

Answer: (C) $-\frac{5}{7}$ · The council's preliminary key

Q87 AP EAPCET 2025 · 21 May · Shift 2 MCQ

If $\lim_{x\to a^+} f(x)=p$, $\lim_{x\to a^-} f(x)=m$ and $f(a)=k$, then which one of the following is true ?

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(A) When $p-k\neq 0$ and $m-k\neq 0$, then $f(x)$ is continuous at $x=a$

(B) When $p-k=0$ and $m-k\neq 0$, then $f(x)$ is left continuous at $x=a$

(C) When $p-k\neq 0$ and $m-k=0$, then $f(x)$ is right continuous at $x=a$

(D) When $p-m=0$ and $p-k=0$, then $f(x)$ is right continuous at $x=a$

Answer: (D) When $p-m=0$ and $p-k=0$, then $f(x)$ is right continuous at $x=a$ · The council's preliminary key

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Q88 AP EAPCET 2025 · 21 May · Shift 2 MCQ

If a function f defined by

$$f(x)=\begin{cases}\dfrac{1-\cos 4x}{x^2}, & x<0\\ a, & x=0\\ \dfrac{\sqrt{x}}{\sqrt{16+\sqrt{x}}-4}, & x>0\end{cases}$$

is continuous at $x=0$, then $a=$

(A) 8

(B) 4

(C) 3

(D) 2

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

Q89 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If $\lim_{x\to 0}\dfrac{3^{x^3}-(1-x^3)^{2/3}}{x^2\sin x}=p+\log q$ then $pq=$

(A) $\dfrac{2}{3}$

(B) 2

(C) 3

(D) -2

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

Q90 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If $[x]$ is the greatest integer function and $f(x)=\begin{cases}2[x]-\dfrac{x}{|x|}, & x\neq 0\\ 1, & x=0\end{cases}$ is a real valued function, then f is

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(A) continuous at $x = 0$

(B) continuous at $x = 1$

(C) left continuous at $x = 0$

(D) right continuous at $x = 1$

Answer: (D) right continuous at $x = 1$ · The council's preliminary key

Q91 TS EAPCET 2025 · 4 May · Shift 2 MCQ

$$\lim_{x \to 0} \frac{\sqrt{\cos x} - \sqrt[3]{\cos x}}{\sin^2 x} =$$

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

(B) $-\frac{1}{12}$

(C) $-\frac{1}{6}$

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

Answer: (B) $-\frac{1}{12}$ · The council's preliminary key

Q92 TS EAPCET 2025 · 4 May · Shift 2 MCQ

If $f(x) = \begin{cases} x^2 \left|\cos \frac{\pi}{x}\right|, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then at $x = 2$, $f(x)$ is

(A) Differentiable

(B) Continuous but not differentiable

(C) Right differentiable only

(D) Left differentiable only

Answer: (B) Continuous but not differentiable · The council's preliminary key

Q93 TS EAPCET 2025 · 4 May · Shift 2 MCQ

The set of all values of x for which $f(x) = \big|\,|x| - 1\,\big|$ is differentiable is

(A) $\{-1, 1\}$

(B) $\mathbb{R} - \{-1, 1, 0\}$

(C) $\mathbb{R}$

(D) $(0, \infty)$

Answer: (B) $\mathbb{R} - \{-1, 1, 0\}$ · The council's preliminary key

Q94 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If $\{x\} = x - [x]$ where $[x]$ is the greatest integer $\leq x$ and

$$\lim_{x \to 0^-} \frac{\mathrm{Cos}^{-1}\left(1 - \{x\}^2\right) \mathrm{Sin}^{-1}\left(1 - \{x\}\right)}{\{x\} - \{x\}^4} = \theta$$

then $\tan\theta =$

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

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

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Q95 TS EAPCET 2025 · 3 May · Shift 1 MCQ

For $a \neq 0$ and $b \neq 0$, if the real valued function $f(x) = \frac{\sqrt[5]{a(625+x)} - 5}{\sqrt[4]{625+bx} - 5}$ is continuous at $x = 0$, then $f(0) =$

(A) $\frac{4b}{5}$
(B) $\frac{5b}{4}$
(C) $\frac{5}{4b}$
(D) $\frac{4}{5b}$

Answer: (D) $\frac{4}{5b}$ · The council's preliminary key

Q96 TS EAPCET 2025 · 3 May · Shift 1 MCQ

The values of x at which the real valued function $f(x) = 7|2x+1| - 19|3x-5|$ is not differentiable is

(A) $1, -1$
(B) $\frac{1}{2}, -\frac{5}{3}$
(C) $-\frac{1}{2}, \frac{5}{3}$
(D) $0, 1$

Answer: (C) $-\frac{1}{2}, \frac{5}{3}$ · The council's preliminary key

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Q97 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If $[t]$ represents the greatest integer $\leq t$ then the value of $\lim_{x\to 3} \frac{11 - [2-x]}{[x+10]}$ is

(A) 1
(B) 8
(C) 5
(D) does not exist

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

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Q98 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If the real valued function $f(x)=\begin{cases}\dfrac{\cos 3x-\cos x}{x\sin x} & \text{if } x<0\\ \mathrm{p} & \text{if } x=0\\ \dfrac{\log(1+\mathrm{q}\sin x)}{x} & \text{if } x>0\end{cases}$ is continuous at $x=0$ then $\mathrm{p}+\mathrm{q}=$

(A) 4
(B) -4
(C) 8
(D) -8

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

Q99 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If $[x]$ is the greatest integer function then $\lim\limits_{x\to 3^-}\dfrac{(3-|x|+\sin|3-x|)\cos[9-3x]}{|3-x|[3x-9]}=$

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

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

Q100 TS EAPCET 2025 · 2 May · Shift 1 MCQ

Let 'a' be a positive real number. If a real valued function

$$f(x)=\begin{cases}\dfrac{6^x-3^x-2^x+1}{1-\cos\left(\frac{x}{a}\right)} & \text{if } x\neq 0\\ \log 3\log 4 & \text{if } x=0\end{cases}$$

is continuous at $x=0$, then $a=$

(A) 1
(B) 2
(C) 3
(D) 4

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

Q101 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If $f(x)=\dfrac{x(a^x-1)}{1-\cos x}$ and $g(x)=\dfrac{x(1-a^x)}{a^x\left(\sqrt{1-x^2}-\sqrt{1+x^2}\right)}$, then $\lim_{x\to 0}(f(x)-g(x))=$

(A) $3\log a$

(B) e^a

(C) $2\log a$

(D) $\log a$

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

Q102 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If $f(x)=\begin{cases}\dfrac{a\sin x-bx+cx^2+x^3}{2\log(1+x)-2x+x^2}, & x\neq 0\\ 0, & x=0\end{cases}$ is continuous at $x=0$, then

(A) $a=2b$

(B) $a=b$

(C) $a=b=c$

(D) $b=c$

Answer: (B) $a=b$ · The council's preliminary key

Q103 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If the function $g(x)=\begin{cases}K\sqrt{x+1}, & 0\le x\le 3\\ mx+2, & 3<x\le 5\end{cases}$ is differentiable, then $K+m=$

(A) 4

(B) 2

(C) 6

(D) 0

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

Q104 AP EAPCET 2024 · 23 May · Shift 1 MCQ

Let $f(x)=\begin{cases}1+\dfrac{2x}{a}, & 0\le x\le 1\\ ax, & 1<x\le 2\end{cases}$. If $\lim_{x\to 1} f(x)$ exists then the sum of the cubes of the possible values of a is

(A) 1

(B) 5

(C) 7

(D) 9

Answer: (C) 7 · The council's preliminary key

Q105 AP EAPCET 2024 · 23 May · Shift 1 MCQ

Let $[P]$ denote the greatest integer $\leq P$. If $0 \leq a \leq 2$, then the number of integral values of 'a' such that $\lim_{x \to a}([x^2] - [x]^2)$ does not exist is

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

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

Q106 AP EAPCET 2024 · 23 May · Shift 1 MCQ

If $f(x) = \begin{cases} \dfrac{\sqrt{a^2 - ax + x^2} - \sqrt{x^2 + ax + a^2}}{\sqrt{a + x} - \sqrt{a - x}}, & x \neq 0 \\ K, & x = 0 \end{cases}$ is continuous at $x = 0$, then $K =$

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

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

Q107 AP EAPCET 2024 · 23 May · Shift 1 MCQ

If $f(x) = \begin{cases} ax^2 + bx - \dfrac{13}{8}, & x \leq 1 \\ 3x - 3, & 1 < x \leq 2 \\ bx^3 + 1, & x > 2 \end{cases}$ is differentiable $\forall\, x \in R$, then $a - b =$

(A) $\dfrac{9}{8}$
(B) $\dfrac{5}{4}$
(C) $\dfrac{11}{8}$
(D) $\dfrac{1}{4}$

Answer: (A) $\dfrac{9}{8}$ · The council's preliminary key

Q108 AP EAPCET 2024 · 23 May · Shift 1 MCQ

The function $f(x) = \begin{cases} \dfrac{x - |x|}{x}, & x \neq 0 \\ 2, & x = 0 \end{cases}$

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(A) is continuous for $\forall x \in R$

(B) has maximum value 2

(C) has neither minimum nor maximum

(D) has minimum value 2

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

Q109 AP EAPCET 2024 · 22 May · Shift 1 MCQ

$\lim_{x\to 0}\left[\frac{1}{x}-\frac{1}{e^x-1}\right]=$

(A) 0

(B) 1

(C) 2

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

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

Q110 AP EAPCET 2024 · 22 May · Shift 1 MCQ

Let $f(x)=\begin{cases}0, & x=0\\ 2-x, & \text{for } 0<x<1\\ 2, & \text{for } x=1\\ \frac{1}{2}-x, & \text{for } 1<x<2\\ \frac{-3}{2}, & \text{for } x\geq 2\end{cases}$

then which of the following is true

(A) f is right continuous at $x=0$

(B) f is left continuous at $x=1$

(C) f is right continuous at $x=1$

(D) f is continuous at $x=2$

Answer: (D) f **is continuous at** $x=2$ · The council's preliminary key

Q111 AP EAPCET 2024 · 22 May · Shift 1 MCQ

If $f(x)=\left(\frac{1+x}{1-x}\right)^{1/x}$ is continuous at $x=0$ then $f(0)=$

(A) $e^{1/2}$

(B) e^2

(C) e^{-2}

(D) $e^{-1/2}$

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

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Q112 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The function $f(x) = |x - 24|$ is

(A) Differentiable on $[0, 25]$

(B) not continuous at $x = 24$

(C) neither continuous nor differentiable on $[0, 25]$

(D) Continuous on $[0, 25]$, but not differentiable on $[0, 25]$

Answer: (D) Continuous on $[0, 25]$, but not differentiable on $[0, 25]$ · The council's preliminary key

Q113 AP EAPCET 2024 · 22 May · Shift 2 MCQ

$$\lim_{x \to \infty} \frac{[2x - 3]}{x} =$$

(A) 0

(B) ∞

(C) -3

(D) 2

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

Q114 AP EAPCET 2024 · 22 May · Shift 2 MCQ

$$\lim_{x \to 0} \frac{\cos 2x - \cos 3x}{\cos 4x - \cos 5x} =$$

(A) $\frac{5}{9}$

(B) 1

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

(D) $\frac{2}{5}$

Answer: (A) $\frac{5}{9}$ · The council's preliminary key

Q115 AP EAPCET 2024 · 22 May · Shift 2 MCQ

If a real valued function $f(x) = \begin{cases} \dfrac{2x^2 + (k+2)x + 9}{3x^2 - 7x - 6}, & \text{for } x \neq 3 \\ l, & \text{for } x = 3 \end{cases}$ is continuous at $x = 3$ and l is a finite value, then $l - k =$

(A) $\frac{31}{11}$

(B) $\frac{124}{11}$

(C) 24

(D) 32

Answer: (B) $\frac{124}{11}$ · The council's preliminary key

Q116 AP EAPCET 2024 · 21 May · Shift 1 MCQ

If $f(x)=\dfrac{5x.\text{cosec}(\sqrt{x})-1}{(x-2)\text{cosec}(\sqrt{x})}$, then $\lim\limits_{x\to\infty} f(x^2)=$

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

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

Q117 AP EAPCET 2024 · 21 May · Shift 1 MCQ

$$\lim_{x\to 2}\frac{\sqrt{1+4x}-\sqrt{3+3x}}{x^3-8}=$$

(A) $\frac{1}{72}$
(B) $\frac{1}{36}$
(C) $\frac{1}{24}$
(D) $\frac{1}{12}$

Answer: (A) $\frac{1}{72}$ · The council's preliminary key

Q118 AP EAPCET 2024 · 21 May · Shift 1 MCQ

If $\lim_{x\to\infty}\dfrac{(\sqrt{2x+1}+\sqrt{2x-1})^8+(\sqrt{2x+1}-\sqrt{2x-1})^8(Px^4-16)}{(x+\sqrt{x^2-2})^8+(x-\sqrt{x^2-2})^8}=1$, then $P=$

(A) 16
(B) 64
(C) $\dfrac{1}{64}$
(D) $\dfrac{1}{16}$

Answer: (D) $\dfrac{1}{16}$ · The council's preliminary key

Q119 AP EAPCET 2024 · 21 May · Shift 2 MCQ

$$\lim_{x\to 0}\left(\frac{\sin(\pi\cos^2 x)}{x^2}\right)=$$

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

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

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Q120 AP EAPCET 2024 · 21 May · Shift 2 MCQ

$$\lim_{x\to 1}\left(\frac{x+x^2+x^3+\ldots+x^n-n}{x-1}\right)=$$

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

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

Q121 AP EAPCET 2024 · 21 May · Shift 2 MCQ

If the function $f(x)=\frac{\sqrt{1+x}-1}{x}$ is continuous at $x=0$ then $f(0)=$

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

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

Q122 AP EAPCET 2024 · 20 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{\sqrt{1+\sqrt{1+x^4}}-\sqrt{2+x^5+x^6}}{x^4}=$$

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

Answer: (A) $\frac{1}{4\sqrt{2}}$ · The council's preliminary key

Q123 AP EAPCET 2024 · 20 May · Shift 1 MCQ

$$\lim_{x\to 1}\frac{\sqrt{x}-1}{(\cos^{-1}x)^2}=$$

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

Answer: (A) $-\frac{1}{4}$ · The council's preliminary key

Q124 AP EAPCET 2024 · 20 May · Shift 1 MCQ

If a function $f(x) = \begin{cases} \frac{\tan(\alpha+1)x + \tan 2x}{x} & \text{if } x > 0 \\ \beta & \text{at } x = 0 \\ \frac{\sin 3x - \tan 3x}{x^3} & \text{if } x < 0 \end{cases}$ is continuous at $x = 0$ then $|\alpha| + |\beta| =$

(A) 60
(B) 30
(C) 15
(D) 45

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

Q125 AP EAPCET 2024 · 20 May · Shift 2 MCQ

$$\lim_{x \to \frac{\pi}{4}} \frac{4\sqrt{2} - (\cos x + \sin x)^5}{1 - \sin 2x} =$$

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

Answer: (A) $5\sqrt{2}$ · The council's preliminary key

Q126 AP EAPCET 2024 · 20 May · Shift 2 MCQ

If $\lim_{x \to 0} \frac{e^x - a - \log(1+x)}{\sin x} = 0$, then $a =$

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

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

Q127 AP EAPCET 2024 · 20 May · Shift 2 MCQ

The values of a and b for which the function $f(x)=\begin{cases}(1+|\sin x|)^{a/|\sin x|}, & \frac{-\pi}{6}<x<0\\ b, & x=0\\ e^{\tan 2x/\tan 3x}, & 0<x<\frac{\pi}{6}\end{cases}$ is continuous at $x=0$ are

(A) $a=1, b=\frac{2}{3}$
(B) $a=\frac{2}{3}, b=e^{2/3}$
(C) $a=\frac{2}{3}, b=\frac{3}{2}$
(D) $a=-1, b=e^{2/3}$

Answer: (B) $a=\frac{2}{3}, b=e^{2/3}$ · The council's preliminary key

Q128 AP EAPCET 2024 · 20 May · Shift 2 MCQ

If $f(x)=\begin{cases}2x+3, & x\le 1\\ ax^2+bx, & x>1\end{cases}$ is differentiable $\forall\, x\in\mathbb{R}$, then $f'(2)=$

(A) 5
(B) 4
(C) -4
(D) -10

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

Q129 AP EAPCET 2024 · 20 May · Shift 2 MCQ

In the interval $[0,3]$, the function $f(x)=|x-1|+|x-2|$ is

(A) Discontinuous
(B) differentiable
(C) Continuous but not differentiable at $x=2$ only
(D) Continuous but not differentiable at $x=1$ and $x=2$

Answer: (D) Continuous but not differentiable at $x=1$ and $x=2$ · The council's preliminary key

Q130 AP EAPCET 2024 · 19 May · Shift 2 MCQ

$$\lim_{x\to 3}\frac{x^3-27}{x^2-9}=$$

(A) $\frac{3}{2}$
(B) $\frac{9}{2}$
(C) 3
(D) 2

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

Q131 AP EAPCET 2024 · 19 May · Shift 2 MCQ

If $f(x)=\begin{cases}3ax-2b, & x>1\\ ax+b+1, & x<1\end{cases}$ and $\lim_{x\to 1} f(x)$ exists, then the relation between a and b is

(A) $3a-2b=1$
(B) $2a-3b=1$
(C) $2a+3b=1$
(D) $2a+3b=-1$

Answer: (B) $2a-3b=1$ · The council's preliminary key

Q132 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The function $f(x)=\begin{cases}\frac{2}{5-x}, & x<3\\ 5-x, & x\geq 3\end{cases}$ is

(A) left discontinuous at $x=3$
(B) left continuous at $x=3$
(C) right discontinuous at $x=5$
(D) discontinuous at $x=5$

Answer: (A) left discontinuous at $x=3$ · The council's preliminary key

Q133 AP EAPCET 2024 · 19 May · Shift 2 MCQ

If $f(x)=\begin{cases}x^{\alpha}\sin\left(\frac{1}{x}\right), & x\neq 0\\ 0, & x=0\end{cases}$; Which of the following is true?

(A) $f(x)$ is continuous and differentiable if $0\leq\alpha<1$
(B) $f(x)$ is discontinuous and not differentiable if $0\leq\alpha<1$
(C) $f(x)$ is continuous and differentiable for $\alpha>1$
(D) $f(x)$ is discontinuous and differentiable for $\alpha>1$

Answer: (C) $f(x)$ **is continuous and differentiable for** $\alpha>1$ · The council's preliminary key

Q134 AP EAPCET 2024 · 19 May · Shift 2 MCQ

Let $f(x)=\min\{x,x^2\}$ for every real number of x, then

(A) $f(x)$ is continuous for all x
(B) $f(x)$ is differentiable for all x
(C) $f'(x)=2$ for all $x>1$
(D) $f(x)$ is not differentiable at three values of x

Answer: (A) $f(x)$ **is continuous for all** x · The council's preliminary key

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Q135 AP EAPCET 2024 · 18 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{1-\cos x\cos 2x}{\sin^2 x}=$$

(A) $\frac{11}{4}$
(B) $\frac{5}{2}$
(C) 3
(D) 5

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

Q136 AP EAPCET 2024 · 18 May · Shift 1 MCQ

$$\lim_{x\to\infty}\left(\frac{3x^2-2x+3}{3x^2+x-2}\right)^{3x-2}=$$

(A) -3
(B) e^{-1}
(C) e^{-3}
(D) -1

Answer: (C) e^{-3} · The council's preliminary key

Q137 AP EAPCET 2024 · 18 May · Shift 1 MCQ

$$f(x)=\begin{cases}\dfrac{(2x^2-ax+1)-(ax^2+3bx+2)}{x+1}, & \text{if } x\neq -1\\ k, & \text{if } x=-1\end{cases}$$

is a real valued function. If $a,b,k\in R$ and f is continuous on R then $k=$

(A) $-\frac{1}{3}$
(B) 6
(C) $a-2$
(D) $a-3$

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

Q138 AP EAPCET 2024 · 18 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{2x\,e^{1/2x}-3x\,e^{-1/2x}}{e^{1/2x}+4\,e^{-1/2x}} & \text{if } x\neq 0\\ 0 & \text{if } x=0\end{cases}$ is a real valued function then

(A) $f'(0+) = \frac{-3}{4}$

(B) $f'(0-) = 2$

(C) f is not differentiable at $x = 0$

(D) f is differentiable at $x = 0$

Answer: (C) f is not differentiable at $x = 0$ · The council's preliminary key

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Q139 TS EAPCET 2024 · 11 May · Shift 1 MCQ

$$\lim_{x \to \frac{3}{2}} \frac{(4x^2 - 6x)(4x^2 + 6x + 9)}{\sqrt[3]{2x} - \sqrt[3]{3}} =$$

(A) $\sqrt[3]{3^{17}}$

(B) $\sqrt[3]{3^{16}}$

(C) $\sqrt[3]{3^{15}}$

(D) $\sqrt[3]{3^{14}}$

Answer: (A) $\sqrt[3]{3^{17}}$ · The council's preliminary key

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Q140 TS EAPCET 2024 · 11 May · Shift 1 MCQ

If the real valued function $f(x) = \begin{cases} \frac{(4^x - 1)^4 \cot(x \log 4)}{\sin(x \log 4) \log(1 + x^2 \log 4)}, & \text{if } x \neq 0 \\ k, & \text{if } x = 0 \end{cases}$ is continuous at $x = 0$, then $e^k =$

(A) 1

(B) 4

(C) e

(D) 2

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

Q141 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If $\lim_{x \to 4} \frac{2x^2 + (3 + 2a)x + 3a}{x^3 - 2x^2 - 23x + 60} = \frac{11}{9}$, then $\lim_{x \to a} \frac{x^2 + 9x + 20}{x^2 - x - 20} =$

(A) -9

(B) -4

(C) $-\frac{1}{4}$

(D) $-\frac{1}{9}$

Answer: (D) $-\frac{1}{9}$ · The council's preliminary key

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Q142 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If the function $f(x) = \begin{cases} \frac{\tan a(x-1)}{x-1}, & \text{if } 0 < x < 1 \\ \frac{x^3-125}{x^2-25}, & \text{if } 1 \le x \le 4 \\ \frac{b^x-1}{x}, & \text{if } x > 4 \end{cases}$

is continuous in its domain, then $6a + 9b^4 =$

(A) 284
(B) 261
(C) 214
(D) 317

Answer: (A) 284 · The council's preliminary key

Q143 TS EAPCET 2024 · 10 May · Shift 2 MCQ

If $0 \le x \le \pi/2$, then $\lim_{x\to a} \frac{|2\cos x - 1|}{2\cos x - 1}$

(A) does not exist at all points in $\left[0, \frac{\pi}{2}\right]$
(B) $= 1$ when $a = \pi/3$
(C) $= -1$, when $a = \pi/3$
(D) $= 1$, when $0 \le a < \pi/3$

Answer: (D) $= 1$, when $0 \le a < \pi/3$ · The council's preliminary key

Q144 TS EAPCET 2024 · 10 May · Shift 2 MCQ

The real valued function $f(x) = \frac{|x-a|}{x-a}$ is

(A) continuous only at $x = a$
(B) discontinuous only for $x > a$
(C) a constant function when $x > a$
(D) strictly increasing when $x < a$

Answer: (C) a constant function when $x > a$ · The council's preliminary key

Q145 TS EAPCET 2024 · 10 May · Shift 2 MCQ

If $f(x) = 3x^{15} - 5x^{10} + 7x^5 + 50\cos(x-1)$, then $\lim_{h\to 0} \frac{f(1-h) - f(1)}{h^3 + 3h} =$

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(A) -25

(B) 25

(C) -10

(D) 10

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

Q146 TS EAPCET 2024 · 10 May · Shift 2 MCQ

If the function $f(x) = \begin{cases} \dfrac{(e^{kx}-1)\sin kx}{4\tan x}, & x \neq 0 \\ P, & x = 0 \end{cases}$ is differentiable at $x = 0$, then

(A) $P = 0, f'(0) = \dfrac{k^2}{4}$

(B) $P = 0, f'(0) = -\dfrac{1}{2}$

(C) $P = k, f'(0) = -\dfrac{k^2}{4}$

(D) $P = k, f'(0) = -\dfrac{1}{4}$

Answer: (A) $P = 0, f'(0) = \dfrac{k^2}{4}$ · The council's preliminary key

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Q147 TS EAPCET 2024 · 9 May · Shift 1 MCQ

$$\lim_{x\to 0} \frac{3^{\sin x} - 2^{\tan x}}{\sin x} =$$

(A) 0

(B) 1

(C) $\log_e 6$

(D) $\log_e \frac{3}{2}$

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

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Q148 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If the function $f(x) = \begin{cases} \dfrac{\cos ax - \cos 9x}{x^2}, & \text{if } x \neq 0 \\ 16, & \text{if } x = 0 \end{cases}$ is continuous at $x = 0$, then $a =$

(A) ± 8

(B) ± 7

(C) ± 6

(D) ± 5

Answer: (B) ± 7 · The council's preliminary key

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Q149 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If

$$f(x)=\begin{cases}\dfrac{8}{x^3}-6x & \text{, if } 0<x\leq 1\\ \dfrac{x-1}{\sqrt{x}-1} & \text{, if } x>1\end{cases}$$

is a real valued function, then at $x=1$, f is

(A) continuous and differentiable
(B) continuous but not differentiable
(C) neither continuous nor differentiable
(D) differentiable but not continuous

Answer: (B) continuous but not differentiable · The council's preliminary key

Q150 TS EAPCET 2024 · 9 May · Shift 2 MCQ

$$\lim_{\theta\to\frac{\pi}{2}^-}\frac{8\tan^4\theta+4\tan^2\theta+5}{(3-2\tan\theta)^4}=$$

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

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

Q151 TS EAPCET 2024 · 9 May · Shift 2 MCQ

Define $f:\mathbb{R}\to\mathbb{R}$ by $f(x)=\begin{cases}\dfrac{1-\cos 4x}{x^2}, & x<0\\ a, & x=0\\ \dfrac{\sqrt{x}}{\sqrt{16+\sqrt{x}}-4}, & x>0\end{cases}$

Then the value of 'a' so that f is continuous at $x=0$ is

(A) 8
(B) 4
(C) 2
(D) 1

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

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Q152 AP EAPCET 2023 · 19 May · Shift 1 MCQ

Let $f(x)=\sqrt{\frac{x}{1-x}}+\sqrt{\frac{1-x}{x}}$. If $\lim_{x\to 1^-} f(x)=l$ and $\lim_{x\to m} f(x)=5/2$, then the set of all possible finite values of l and m is

(A) $\{0,1\}$
(B) $\left\{0,\frac{1}{3},\frac{2}{3}\right\}$
(C) $\left\{0,\frac{2}{5},\frac{3}{5}\right\}$
(D) $\left\{\frac{1}{5},\frac{4}{5}\right\}$

Answer: (D) $\left\{\frac{1}{5},\frac{4}{5}\right\}$ · The council's preliminary key

Q153 AP EAPCET 2023 · 19 May · Shift 1 MCQ

If a function $f(x)$ defined on $[a,b]$ is discontinuous at $x=\alpha\in(a,b)$, then

(A) $\lim_{x\to\alpha^-} f(x)=\lim_{x\to\alpha^+} f(x)=f(\alpha)$
(B) $\lim_{x\to\alpha} f(x)\neq f(\alpha)$
(C) $\lim_{x\to a^-} f(x)=f(a)$
(D) $\lim_{x\to b^+} f(x)=f(b)$

Answer: (B) $\lim_{x\to\alpha} f(x)\neq f(\alpha)$ · The council's preliminary key

Q154 AP EAPCET 2023 · 19 May · Shift 1 MCQ

Let $[t]$ represents the greatest integer not exceeding t.

Then the number of discontinuous points of $[10^x]$ in $(0,10)$ is

(A) $10^{10}-1$
(B) 10^{10}
(C) $10^{10}-2$
(D) e^{10}

Answer: (C) $10^{10}-2$ · The council's preliminary key

Q155 AP EAPCET 2023 · 19 May · Shift 1 MCQ

Assertion (A): If $f(x)$ is not continuous at $x=a$, then it is not differentiable at $x=a$

Reason (R): If $f(x)$ is differentiable at a point, then it is continuous at that point

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

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

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

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

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

Q156 AP EAPCET 2023 · 18 May · Shift 1 MCQ

If $f(x)=\dfrac{1-x+\sqrt{9x^2+10x+1}}{2x}$, then $\lim_{x\to -1^-} f(x)=$

(A) 1

(B) -1

(C) 0

(D) $-1/5$

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

Q157 AP EAPCET 2023 · 18 May · Shift 1 MCQ

Which one of the following function is discontinuous at $x=1$?

(A) $f(x)=\sin^2 x+\tan^2 x+\cos^2 x-\sec^2 x$

(B) $f(x)=\dfrac{1}{1+2^{\sin x}}$

(C) $f(x)=\begin{cases}\dfrac{x-1}{|x-1|+2(x-1)^2}, & x\neq 1\\ 1, & x=1\end{cases}$

(D) $f(x)=e^x+5$

Answer: (C) $f(x)=\begin{cases}\dfrac{x-1}{|x-1|+2(x-1)^2}, & x\neq 1\\ 1, & x=1\end{cases}$ · The council's preliminary key

Q158 AP EAPCET 2023 · 18 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{1}{2}(b^2-a^2), & 0\le x\le a\\ \dfrac{1}{2}b^2-\dfrac{x^2}{6}-\dfrac{a^3}{3x}, & a<x\le b\\ \dfrac{1}{3}\left(\dfrac{b^3-a^3}{x}\right), & x>b\end{cases}$, then

(A) $f''(a)=2b$

(B) $f''(a)=1$

(C) $f''(a)=b^2-a^2$

(D) $f'(x)$ is not differentiable at $x=a$

Answer: (D) $f'(x)$ is not differentiable at $x=a$ · The council's preliminary key

Q159 AP EAPCET 2023 · 18 May · Shift 2 MCQ

$$\lim_{x\to -9}\frac{(2.5)^{81-x^2}-(0.4)^{x+9}}{x+9}=$$

(A) $18\log(2.5)+\log(0.4)$
(B) $\log(2.5)-\log(0.4)$
(C) $18(\log(2.5)+\log(0.4))$
(D) $-19\log(0.4)$

Answer: (D) $-19\log(0.4)$ · The council's preliminary key

Q160 AP EAPCET 2023 · 18 May · Shift 2 MCQ

Let $S_n=1+3x+9x^2+27x^3+\ldots n$ terms and $-\frac{1}{3}<x<\frac{1}{3}$. If $\lim_{n\to\infty}S_n=f(x)$, then $f(x)$ is discontinuous at the point $x=$

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

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

Q161 AP EAPCET 2023 · 18 May · Shift 2 MCQ

Let [.] denote the greatest integer function.

Assertion (A): $\lim_{x\to\infty}\frac{[x]}{x}=1$

Reason (R): $f(x)=x-1$, $g(x)=[x]$, $h(x)=x$ and $\lim_{x\to\infty}\frac{f(x)}{x}=\lim_{x\to\infty}\frac{h(x)}{x}=1$

(A) A is true, R is true; R is correct explanation of A
(B) A, R are true; R is not the correct explanation of A
(C) A is true, R is false
(D) A is false, R is true

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

Q162 AP EAPCET 2023 · 18 May · Shift 2 MCQ

If $f(x)=\begin{cases}ax^2-bx+2, & x<3\\ bx^2-3, & x\geq 3\end{cases}$ is differentiable at every $x\in\mathbb{R}$, then the area (in sq units) of the triangle formed by the line $\frac{x}{a}+\frac{y}{b}=1$ with the coordinate axes is

(A) $\frac{175}{81}$
(B) $\frac{175}{27}$
(C) $\frac{35}{27}$
(D) $\frac{125}{27}$

Answer: (B) $\frac{175}{27}$ · The council's preliminary key

Q163 AP EAPCET 2023 · 17 May · Shift 1 MCQ

If $\lim_{x\to 1}\frac{\sqrt[4]{x^{-3}}+a\sqrt[4]{x^5}}{x-1}=-2$, then the coefficient of x in the expansion of $\left(\sqrt[4]{x^{-3}}+a\sqrt[4]{x^5}\right)^4$ is

(A) 6
(B) -1
(C) 5
(D) 4

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

Q164 AP EAPCET 2023 · 17 May · Shift 1 MCQ

Let $[t]$ represents the greatest integer not exceeding t and $C=1-2e^2$.

If the function $f(x)=\begin{cases}[e^x], & x<0\\ ae^x+[x-2], & 0\le x<2\\ [e^{-x}]-C, & x\ge 2\end{cases}$

is continuous at $x=2$, then $f(x)$ is discontinuous at

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

Answer: (A) $x=1$ only · The council's preliminary key

Q165 AP EAPCET 2023 · 17 May · Shift 1 MCQ

$f(x)$ is differentiable on $\mathbb{R}$ and $f'(m)\neq 0$, $m\in\mathbb{R}$.

If $\lim\limits_{x\to m}\frac{xf(m)-mf(x)}{x-m}+f'(m)=f(m)$, then $m=$

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

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

Q166 AP EAPCET 2023 · 17 May · Shift 1 MCQ

Let $f(x)=\begin{cases}\dfrac{5e^{1/x}+2}{3-e^{1/x}}, & x\neq 0\\ 0, & x=0\end{cases}$.

Then at $x=0$, $xf(x)$ and $f(x)$ are respectively

(A) Differentiable and continuous
(B) Continuous and differentiable
(C) Continuous and not differentiable
(D) Not differentiable and continuous

Answer: (C) Continuous and not differentiable · The council's preliminary key

Q167 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If $f(x)=3x+\dfrac{12}{x}$ is continuous on $\mathbb{R}-\{0\}$ and M is its maximum value, then $\lim_{x\to M} f(x)=$

(A) 37
(B) -37
(C) 2
(D) -2

Answer: (B) -37 · The council's preliminary key

Q168 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If $\lim_{x\to 2}\dfrac{1+\sqrt{1+4\log_2 x}}{2+(2x+\sin^2 x+2\cos x)(2x-4)}=m$, then $m(m-1)=$

(A) 0
(B) $\log_2 e$
(C) 1
(D) $\dfrac{1+\sqrt{3}}{2}$

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

Q169 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If a function $f(x)$ defined by $f(x)=\begin{cases}ax^2+bx+c, & x\leq -1\\ 2x^2+4x+1, & -1<x<1\\ cx^2+bx+a, & x\geq 1\end{cases}$ is continuous on $\mathbb{R}$, and $\lim_{x\to\frac{3}{2}} f(x)=14$, then $\lim_{x\to -2} f(x)=$

(A) 6
(B) -8
(C) 5
(D) 1

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

Q170 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If $\alpha \in \mathbb{R} - \{-1\}$ and $f(x) = |(|x| + \alpha)(|x| - 1)|$, then the number of points at which $f(x)$ is not differentiable, is

(A) 3, when $\alpha < 0$
(B) 5, when $\alpha > 0$
(C) 4, when $\alpha > 0$
(D) 5, when $\alpha < 0$

Answer: (D) 5, when $\alpha < 0$ · The council's preliminary key

Q171 AP EAPCET 2023 · 16 May · Shift 1 MCQ

Let $f(x) = |x - 3| + |x + 5|$ and $A = \left\{a \in \mathbb{R} \,/\, \lim_{x \to a} \frac{f(x) - f(a)}{x - a} \text{ exists}\right\}$. Then the number of real numbers which are in $(-\infty, -3) \cup (5, \infty)$ but not in A is

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

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

Q172 AP EAPCET 2023 · 16 May · Shift 1 MCQ

$$\lim_{x \to 1} \left(\lim_{y \to \infty} y \left((ex)^{1/y} - 1 \right) \right) =$$

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

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

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Q173 AP EAPCET 2023 · 16 May · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{\sqrt{\pi}-\sqrt{\cos^{-1}x}}{\sqrt{x+1}}, & x\neq -1\\ \dfrac{1}{\sqrt{\lambda\pi}}, & x=-1\end{cases}$ is right continuous at $x=-1$, then $\lambda=$

(A) 1
(B) π
(C) 2π
(D) 2

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

Q174 AP EAPCET 2023 · 16 May · Shift 1 MCQ

If $f(x)=\begin{cases}x\left(1+\dfrac{1}{2}\sin(\log x^2)\right), & x\neq 0\\ 0, & x=0\end{cases}$, then $\lim_{x\to 0}\dfrac{f(x)-f(0)}{x}$

(A) is equal to $f(0)$
(B) does not exist
(C) is equal to $\dfrac{1}{2}$
(D) is equal to $f(1)$

Answer: (B) does not exist · The council's preliminary key

Q175 AP EAPCET 2023 · 16 May · Shift 1 MCQ

Let $f(x)=\text{Max}\{\cos x,\sin x,0\}$. If the number of points at which $f(x)$ is not differentiable in $(0,2024\pi)$ is $1012k$, then $k=$

(A) $3/2$
(B) 6
(C) 3
(D) 2

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

Q176 AP EAPCET 2023 · 16 May · Shift 2 MCQ

Assertion (A): $\lim_{x\to 0}\frac{1}{x}=\infty$

Reason (R): As the value of x decreases, the value of $\frac{1}{x}$ increases

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

Answer: (D) A is false and R is true · The council's preliminary key

Q177 AP EAPCET 2023 · 16 May · Shift 2 MCQ

If a function defined by $f(x) = \dfrac{(3^x - 1)^2}{\sin x \, \log(1+x)}$, $x \neq 0$, is continuous at $x = 0$, then $f(0) =$

(A) $2 \log 3$
(B) $\log 3^2$
(C) $2 + \log 3$
(D) $(\log 3)^2$

Answer: (D) $(\log 3)^2$ · The council's preliminary key

Q178 AP EAPCET 2023 · 16 May · Shift 2 MCQ

Let $[t]$ represents the greatest integer not more than t. Then the number of discontinuous points of $f(x) = \left[x^{\frac{1}{x}}\right]$ in $(0, \infty)$ is

(A) 0
(B) 1
(C) 2
(D) ∞

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

Q179 AP EAPCET 2023 · 15 May · Shift 1 MCQ

If $f(x) = \begin{cases} 1 + 6x - 3x^2, & x \leq 1 \\ x + \log_2(b^2 + 7), & x > 1 \end{cases}$ is continuous at all real x, then $b =$

(A) ± 1
(B) 0
(C) ± 5
(D) ± 2

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

Q180 AP EAPCET 2023 · 15 May · Shift 1 MCQ

Let $f(x)$ be a real valued function. If $f'(x)$ is a constant for all $x \in \mathbb{R}$, $f(0) = 2$ and $f'(0) = 1$, then

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(A) $f(x)$ is not continuous on $\mathbb{R}$

(B) $f(x)$ is continuous at $x = 0, 1, 2$ and 3 only

(C) $f(x)$ is continuous only on $[0, \infty)$

(D) $f(x)$ is continuous on $\mathbb{R}$

Answer: (D) $f(x)$ is continuous on $\mathbb{R}$ · The council's preliminary key

Q181 AP EAPCET 2023 · 15 May · Shift 1 MCQ

If $f : \mathbb{R} \to \mathbb{R}$ defined by

$$f(x) = \begin{cases} \dfrac{\sin x - \sin \frac{x}{2}}{x}, & x < 0 \\ \dfrac{\sqrt{x^2 + x} - \sqrt{x}}{x^{3/2}}, & x > 0 \end{cases}$$

is continuous on $\mathbb{R}$, then $f(0) =$

(A) $1/2$

(B) $3/2$

(C) 1

(D) -1

Answer: (A) $1/2$ · The council's preliminary key

Q182 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The function $f(x) = \sqrt{\dfrac{3x^2 - 5x - 2}{2x^2 - 7x + 5}}$ has discontinuous points at $x =$

(A) $5/2, 2$

(B) $-1/3, 2$

(C) $1, 5/2$

(D) $-1/3, 1$

Answer: (C) $1, 5/2$ · The council's preliminary key

Q183 AP EAPCET 2023 · 15 May · Shift 2 MCQ

If $f(x) = \begin{cases} \dfrac{x - [x]}{x - 2}, & x > 2 \\ b, & x = 2 \\ \dfrac{|x^2 - x - 2|}{a(2 + x - x^2)}, & -1 < x \leq 2 \\ 2a - b, & x \leq -1 \end{cases}$ is continuous on $\mathbb{R}$, then $\lim\limits_{x \to 0} \dfrac{\sin^2 ax + x \tan bx}{x^2} =$

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

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

Q184 AP EAPCET 2023 · 15 May · Shift 2 MCQ

Let $[x]$ represents the greatest integer not more than x.

The discontinuous points of the function $f(x)=\dfrac{5+[x]}{\sqrt{11+[x]-6\sqrt{2+[x]}}}$ lies in the interval

(A) $[0,\infty)$
(B) $[5,8]$
(C) $[7,8)$
(D) $[7,10)$

Answer: (C) $[7,8)$ · The council's preliminary key

Q185 AP EAPCET 2023 · 15 May · Shift 2 MCQ

If $f(x)=|x-5|+|x+5|+|x-4|+|x+4|$, then $\dfrac{f'(1)-f'(-6)}{f'(-1)+f'(6)}=$

(A) 1
(B) 0
(C) $4/5$
(D) $3/2$

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

Q186 TS EAMCET 2023 · 14 May · Shift 1 MCQ

The quadratic equation whose roots are $l=\lim_{\theta\to0}\left(\frac{3\sin\theta-4\sin^3\theta}{\theta}\right)$ and $m=\lim_{\theta\to0}\left(\frac{2\tan\theta}{\theta(1-\tan^2\theta)}\right)$ is

(A) $x^2-5x+6=0$
(B) $x^2+5x+6=0$
(C) $x^2-5x-6=0$
(D) $x^2+5x-6=0$

Answer: (A) $x^2-5x+6=0$ · The council's preliminary key

Q187 TS EAMCET 2023 · 14 May · Shift 2 MCQ

$$\lim_{x\to0}\frac{2\tan x+\cos x-1+x}{\sqrt{4\sin^2x+2\tan x+1}-\sqrt{3\tan^2x+\sin x+1}}=$$

(A) 1
(B) 3
(C) 6
(D) $\frac{2}{3}$

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

Q188 TS EAMCET 2023 · 14 May · Shift 2 MCQ

If a function f is defined by $f(x) = \dfrac{\cot^3 x - \tan x}{\cos(x + \pi/4)}$ $(x \neq \pi/4)$, then $\lim_{x \to \frac{\pi}{4}} f(x) =$

(A) 4
(B) 8
(C) $\frac{8}{3}$
(D) 16

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

Q189 TS EAMCET 2023 · 13 May · Shift 1 MCQ

$\lim_{x \to -2^+}([x]^2 - [x] - 2) + \lim_{x \to -3^-}([x]^2 - 4[x] + 3) =$

(A) 39
(B) 33
(C) 28
(D) 44

Answer: (A) 39 · The council's preliminary key

Q190 TS EAMCET 2023 · 13 May · Shift 1 MCQ

$$\lim_{x \to 0} \frac{(3^{2x} - \sqrt{x+1}) \sin 5x}{1 - \cos 4x} =$$

(A) $\frac{3}{5}(\log 18 - 1)$
(B) $\frac{5}{16} \log\left(\frac{81}{e}\right)$
(C) $\frac{4}{15}(\log 81 - 1)$
(D) $\frac{16}{5}[\log(27) - 1]$

Answer: (B) $\frac{5}{16} \log\left(\frac{81}{e}\right)$ · The council's preliminary key

Q191 TS EAMCET 2023 · 13 May · Shift 1 MCQ

If $f(x) = |x - 1| + |x - 2|$, then $f'(-2023) + f'\left(\frac{2024}{2023}\right) + f'(2023) =$

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

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

Q192 TS EAMCET 2023 · 13 May · Shift 2 MCQ

$$\lim_{x\to 2}\frac{\sqrt[3]{6+x}-\sqrt[3]{10-x}}{x-2}=$$

(A) $\frac{1}{8}$
(B) $\frac{1}{4}$
(C) $\frac{1}{2}$
(D) $\frac{1}{16}$

Answer: (B) $\frac{1}{4}$ · The council's preliminary key

Q193 TS EAMCET 2023 · 13 May · Shift 2 MCQ

$$\lim_{x\to 0}\frac{\tan^4 x-\sin^4 x}{x^6}=$$

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

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

Q194 TS EAMCET 2023 · 12 May · Shift 1 MCQ

$$\lim_{x\to 1}\frac{(2x-3)\left(\sqrt{x}-1\right)}{2x^2+x-3}=$$

(A) $\frac{1}{10}$
(B) $-\frac{1}{10}$
(C) $\frac{2}{5}$
(D) $-\frac{2}{5}$

Answer: (B) $-\frac{1}{10}$ · The council's preliminary key

Q195 TS EAMCET 2023 · 12 May · Shift 1 MCQ

If a, b, c and k are non-zero real numbers and $\lim_{x\to\infty} x\left(a^{1/x}+b^{1/x}+c^{1/x}-3k^{1/x}\right)=0$, then $k=$

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(A) 0
(B) $(abc)^{1/3}$
(C) $(abc)^{-1/3}$
(D) 1

Answer: (B) $(abc)^{1/3}$ · The council's preliminary key

Q196 TS EAMCET 2023 · 12 May · Shift 2 MCQ

$\underset{x\to 1}{\text{Lt}}\ (1-x)\tan\left(\frac{\pi}{2}x\right) =$

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

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

Q197 TS EAMCET 2023 · 12 May · Shift 2 MCQ

If $f(9)=9$ and $f'(9)=4$, then $\lim_{x\to 9}\frac{\sqrt{f(x)}-3}{\sqrt{x}-3} =$

(A) 3
(B) 4
(C) 6
(D) 9

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

Q198 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Let $[x]$ denote the greatest integer less than or equal to x and $f(x)=2x-[2x]$. If $\lim_{x\to 2^-} f(x)=l_1$ and $\lim_{x\to 2^+} f(x)=l_2$ then $l_1+l_2 =$

(A) 1
(B) 2
(C) 0
(D) 4

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

Q199 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

$\lim_{x\to 0}\frac{(2^x-1)(1+\sin x)^{\frac{2}{\sin x}}}{\log(1+2x)} =$

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(A) $e^2 \log 4$
(B) $e \log \sqrt{2}$
(C) $e^2 \log 2$
(D) $e^2 \log \sqrt{2}$

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

Q200 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Let $f(x)$ be a differentiable function such that $f(0) = 0$ and $f'(0) = 20$. For $x \in \left(0, \frac{\pi}{2}\right]$, if $A(x) = 2f(x)\operatorname{cosec} 4x + 4f(x)(\cos^2 x + 1) - 4\cos^2 x$ then $\lim_{x\to 0} A(x) =$

(A) 0
(B) 4
(C) 6
(D) 8

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

Q201 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

$$\lim_{x\to 2} \frac{x^3 - x^2 - x - 2}{2x^3 - 3x^2 - 3x + 2} =$$

(A) 0
(B) ∞
(C) $\frac{5}{7}$
(D) $\frac{7}{9}$

Answer: (D) $\frac{7}{9}$ · The council's preliminary key

Q202 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

$$\lim_{x\to 0} \frac{4\left[\sin(2022x) - \sin(2020x)\right]}{x\left[\cos(2022x) + 2\cos(2021x) + \cos(2020x)\right]} =$$

(A) 1
(B) 2
(C) 2020
(D) 2021

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

Q203 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

$$\lim_{x\to 0} \frac{\tan^2(\pi \sec^4 x)}{\pi^2 x^4} =$$

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(A) 0

(B) 4

(C) 1

(D) 16

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

Q204 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

$\lim\limits_{x\to 0}\left(\frac{4!}{x^8}\left(1-\cos\frac{x^2}{3}-\cos\frac{x^2}{4}+\cos\frac{x^2}{3}\cos\frac{x^2}{4}\right)\right)=$

(A) 8

(B) $\frac{1}{6}$

(C) $\frac{1}{24}$

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

Answer: (C) $\frac{1}{24}$ · The council's preliminary key

Q205 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

Let $f(x)=\sin x$, $g(x)=\cos x$, $h(x)=x^2$ then $\lim\limits_{x\to 1}\frac{f(g(h(x)))-f(g(h(1)))}{x-1}=$

(A) 0

(B) $-2\sin 1\cos(\cos 1)$

(C) ∞

(D) $-2\sin 1\cos 1$

Answer: (B) $-2\sin 1\cos(\cos 1)$ · The council's preliminary key

Q206 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

If $x=\log_e\left(\cot\left(\frac{\pi}{4}+\theta\right)\right)$, then $\lim_{\theta\to 0}\frac{\theta}{(\sinh x)(\cosh x)}=$

(A) 0

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

(C) -2

(D) 1

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

Q207 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

$\lim_{x\to 2}\left[(x^2-4x+4)\cos\left(\frac{2}{x-2}\right)+\frac{x^2-4}{x^3-2x-4}\right]=$

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(A) 0

(B) ∞

(C) 1

(D) $\frac{2}{5}$

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

Q208 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

$\lim_{x\to 0} \frac{\tan 2x - 2\tan x}{(1-\cos x)(2^x-1)} =$

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

(B) $\frac{1}{\log 4}$

(C) $4\log 2$

(D) $\frac{4}{\log 2}$

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

Q209 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

$$\lim_{x\to 3^-} \frac{x^3 - 3x^2 - 4x + 12}{2x^3 - 7x^2 + 2x + 3} =$$

(A) 0

(B) ∞

(C) $\frac{5}{14}$

(D) $\frac{6}{13}$

Answer: (C) $\frac{5}{14}$ · The council's preliminary key

Q210 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

$$\lim_{x\to 0} \frac{2^{2x} - 2^{x+1} + 2 - \cos 2x}{x^2} =$$

(A) $2 + \log 2$

(B) $2 + (\log 2)^2$

(C) $2 + (\log 4)^2$

(D) $2 + \log 4$

Answer: (B) $2 + (\log 2)^2$ · The council's preliminary key

Q211 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

If $f(x) = \begin{cases} \frac{x^2-16}{x-4} & \text{if } x > 4 \\ 2x & \text{if } x \le 4 \end{cases}$ then $f'(4^-) + f'(4^+) =$

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(A) 1
(B) 2
(C) 3
(D) 4

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

Q212 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

$\lim_{x\to\infty} x^3\left[\sqrt{x^2+\sqrt{x^4+1}}-\sqrt{2}x\right] =$

(A) 0
(B) 1
(C) $\frac{1}{4\sqrt{2}}$
(D) $\frac{3}{2\sqrt{2}}$

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

Q213 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

Let $f(x)=\begin{cases}3-x & \text{if } x<-3\\ 6 & \text{if } -3\le x\le 3\\ 3+x & \text{if } x>3\end{cases}$. Let α be the number of points of discontinuity of f and β be the number of points where f is not differentiable. Then $\alpha+\beta =$

(A) 6
(B) 3
(C) 2
(D) 0

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

Q214 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

If $\lim_{n\to\infty} x_n$ exists and is finite, $x_1=2$, $x_{n+1}=\frac{a+bx_n}{b+cx_n}$ $\forall n\in N$ and $c>b>a>0$ then $\lim_{n\to\infty} x_n =$

(A) $\sqrt{ab/c}$
(B) $\sqrt{a/c}$
(C) $\sqrt{c/b}$
(D) $\sqrt{a/b}$

Answer: (B) $\sqrt{a/c}$ · The council's preliminary key

Q215 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

The integral value of n for which $\lim_{x\to 0}\frac{(\cos x-1)(\cos x-e^x)}{x^n}$ is a finite non zero real number is

(A) 4
(B) 3
(C) 2
(D) 1

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

Q216 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

$\lim_{x\to 0} \frac{x^2 \log(\cos x)}{\log(1+x^2)} =$

(A) 0
(B) 1
(C) -1
(D) ∞

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

Q217 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

If $f(x) = \begin{cases} \tan^{-1} x, & \text{when } |x| \le 1 \\ \frac{1}{2}(|x|-1), & \text{when } |x| > 1 \end{cases}$, then the domain of $\frac{d}{dx} f(x)$ is

(A) $\mathbf{R} - \{-1, 1\}$
(B) $\mathbf{R} - (-1, 1)$
(C) $\mathbf{R} - [-1, 1]$
(D) $\mathbf{R} - \{-1\}$

Answer: (A) $\mathbf{R} - \{-1, 1\}$ · Checked by our team

Q218 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

If $[\,.\,]$ denotes greatest integer function, then $\lim_{x\to \frac{\pi}{2}^+} \frac{[\sin x] - [\cos x] + 1}{2} =$

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

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

Q219 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

If $A \neq 0$ and $x > 0$, then $\lim_{n\to\infty} \frac{\cos x - e^{nx}}{1 - Ae^{nx}} =$

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(A) does not exist

(B) 1

(C) $\frac{\cos x}{A}$

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

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

Q220 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

Let $f(x) = \lim_{y\to\infty} y\left(x^{1/y} - 1\right)$, and $2022\, f\left(\frac{1}{x}\right) + P\, f(x) = f(x^2)$, then $P =$

(A) 2020

(B) 2021

(C) 2023

(D) 2024

Answer: (D) 2024 · The council's preliminary key

Q221 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

If $f(x) = |x^2 - 3x + 2|$, then $\frac{df}{dx} =$

(A) $2x - 3$, when $1 < x < 2$

(B) $3 - 2x$, when $x > 2$

(C) $2x - 3$, when $x > 2$

(D) $3 + 2x$, when $1 < x < 2$

Answer: (C) $2x - 3$, when $x > 2$ · The council's preliminary key

Q222 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

If $\lim_{x\to 0^+} x^2\left(\frac{e^{1/x} - e^{-1/x}}{e^{1/x} + e^{-1/x}}\right) = k$ and $\lim_{x\to 0^-} x^2\left(\frac{e^{1/x} - e^{-1/x}}{e^{1/x} + e^{-1/x}}\right) = l$, then

(A) $k = l$

(B) $k = 1, l = -1$

(C) $k = -1, l = 1$

(D) $k \neq l \neq \pm 1$

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

Q223 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

If $f(x) = \frac{e^{1/x} - 1}{e^{1/x} + 1}$, then

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(A) $\lim_{x\to 0} f(x) = 0$
(B) $\lim_{x\to \infty} f(x) = 1$
(C) $\lim_{x\to 0} f(x) = -1$
(D) $\lim_{x\to \infty} f(x) = 0$

Answer: (D) $\lim_{x\to \infty} f(x) = 0$ · The council's preliminary key

Q224 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

$$\lim_{x\to 0} \frac{\sqrt{11+|x|-6\sqrt{2+|x|}}}{6-2\sqrt{2+|x|}} =$$

(A) -1
(B) $-\frac{1}{2}$
(C) $\frac{\sqrt{11-6\sqrt{2}}}{3-\sqrt{2}}$
(D) $\frac{1}{2}$

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

Q225 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

Which of the following is differentiable at $x = 0$?

(A) $f(x) = \cos|x| + |x|$
(B) $f(x) = \sin|x| + |x|$
(C) $f(x) = \cos|x| - |x|$
(D) $f(x) = \sin|x| - |x|$

Answer: (D) $f(x) = \sin|x| - |x|$ · The council's preliminary key

Q226 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

$$\lim_{x\to \infty} x^3 \left\{\sqrt{x^2+\sqrt{x^4+1}} - \sqrt{2}\,x\right\} =$$

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

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

Q227 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

$\lim_{x\to -a} \frac{x^7+a^7}{x+a} = 7 \Rightarrow a =$

(A) ± 7

(B) ± 6

(C) ± 1

(D) ± 2

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

Q228 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

$\lim_{x\to\frac{\pi}{2}} \frac{1-\tan\frac{x}{2}}{1+\tan\frac{x}{2}} \cdot \frac{1-\sin x}{(\pi-2x)^3} =$

(A) $1/32$

(B) 0

(C) $\frac{1}{16}$

(D) $1/8$

Answer: (A) $1/32$ · The council's preliminary key

Q229 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

$$f(x) = \begin{cases} 4 & -\infty < x < -\sqrt{5} \\ x^2 - 1 & -\sqrt{5} \le x \le \sqrt{5} \\ 4 & \sqrt{5} \le x < \infty \end{cases}$$

If k is the number of points where $f(x)$ is not differentiable then $k - 2 =$

(A) 2

(B) 1

(C) 0

(D) 3

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

Q230 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

Assertion (A) : $f(x) = |x|$ is differentiable at $x = a \neq 0$ and continuous but not differentiable at $x = 0$
Reason (R): If a function is differentiable at a point then it is continuous at that point. But converse is not true.

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

(B) A is correct, R is correct, but R is not correct explanation of A

(C) A is correct, R is false.

(D) A is false, R is correct.

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

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Q231 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

If $a > 0$, $b > 0$ then $\lim_{n\to\infty}\left(\frac{a+b^{1/n}-1}{a}\right)^n =$

(A) a^b
(B) b^a
(C) $b^{1/a}$
(D) $a^{1/b}$

Answer: (C) $b^{1/a}$ · The council's preliminary key

Q232 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

$\lim_{x\to\pi/6}\frac{3\sin x-\sqrt{3}\cos x}{6x-\pi} =$

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

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

Q233 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

If $f(x) = \frac{(1-\sin x)}{\log(1+\pi^2-4\pi x+4x^2)}$ is continuous at $x = \pi/2$, then $f(\pi/2) =$

(A) $1/4$
(B) $1/8$
(C) $1/16$
(D) $1/32$

Answer: (B) $1/8$ · The council's preliminary key

Q234 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

If $n > 0$ and $\lim\limits_{x\to 0}\dfrac{((a-n)nx-\tan x)\sin nx}{x^2} = 0$, then minimum value of a is

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

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

Q235 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

$\lim\limits_{x\to 0}\left(\dfrac{e^x-1}{x}\right)^{\frac{x}{x+1-e^x}} =$

(A) e
(B) e^{-1}
(C) e^{2}
(D) e^{-2}

Answer: (B) e^{-1} · The council's preliminary key

Q236 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

Let $f(x)=\begin{cases}|x|, & -\infty<x<2\\ |2x-4|, & 2\le x\le 20\end{cases}$ $x=a$ is a point where $f(x)$ is continuous but not differentiable and $x=b$ is a point where $f(x)$ is not differentiable $(a\neq b)$. Then $a+b=$

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

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

Q237 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

$\lim_{x\to-\infty}\log_e(\cosh x)+x=$

(A) $\log 2$
(B) $-\log 2$
(C) $\log\left(\frac{1}{2}\right)+2$
(D) $\log\left(\frac{1}{2}\right)-2$

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

Q238 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

If a,b,c are three distinct real numbers and $\lim_{x\to\infty}\frac{(b-c)x^2+(c-a)x+(a-b)}{(a-b)x^2+(b-c)x+(c-a)}=\frac{1}{2}$ then $a+2c=$

(A) b
(B) $2b$
(C) $3b$
(D) $4b$

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

Q239 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

$\lim_{x\to-\infty}\frac{3|x|-x}{|x|-2x}-\lim_{x\to0}\frac{\log(1+x^3)}{\sin^3 x}=$

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(A) $\frac{1}{3}$
(B) $-\frac{1}{4}$
(C) 2
(D) $-\frac{5}{3}$

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

Q240 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

$\lim_{n\to\infty} \sqrt{2}\left[\frac{(2+\sqrt{2})^n+(2-\sqrt{2})^n}{(2+\sqrt{2})^n-(2-\sqrt{2})^n}\right] =$

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

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

Q241 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

If $a>0$, $[\cdot]$ denotes greatest integer function and $\lim_{x\to a^-}\left(\frac{|x|^3}{a}-\left[\frac{x}{a}\right]^3\right)=k$, $\lim_{x\to a^+}\left(\frac{|x|^3}{a}-\left[\frac{x}{a}\right]^3\right)=l$, then

(A) $k=l$
(B) $k-l=1$
(C) $l-k=1$
(D) $l=a^2$, k does not exist

Answer: (B) $k-l=1$ · The council's preliminary key

Q242 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

$\lim_{n\to\infty}\frac{A+e^{nx}}{x+Ae^{nx}} =$

(A) $\frac{A}{x}$, when $x<0$
(B) 1, when $x>0$
(C) 0, when $\forall x\in\mathbf{R}$
(D) A, when $x=0$

Answer: (A) $\frac{A}{x}$, when $x<0$ · The council's preliminary key

Q243 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

If $f(x)=\begin{cases}\frac{1-\sin^3 x}{3\cos^2 x}, & x<\frac{\pi}{2}\\ \alpha, & x=\frac{\pi}{2}\\ \frac{\beta(1-\sin x)}{(\pi-2x)^2}, & x>\frac{\pi}{2}\end{cases}$ is continuous at $x=\frac{\pi}{2}$, then $\alpha\beta=$

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

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

Q244 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If $\lim_{x\to 0}\frac{|x|}{\sqrt{x^4+4x^2+5}}=k$, $\lim_{x\to 0}x^4\sin\left(\frac{1}{3\sqrt{x}}\right)=l$, Then k+l =

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

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

Q245 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If $\lim_{n\to\infty}x^n\log_e x=0$, then $\log_x 12=$

(A) Negative
(B) Positive
(C) Zero
(D) any value between -1 and 1

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

Q246 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If $f(x)=\text{Max}\{3-x,\ 3+x,\ 6\}$ is not differentiable at x = a, and x = b, then $|a|+|b|=$

(A) 4
(B) 5
(C) 6
(D) 8

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

Q247 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

If $[\cdot]$ denotes greatest integer function, then $\lim_{x\to\frac{-3}{5}}\frac{1}{x}\left[\frac{-1}{x}\right]=$

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

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

Q248 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

If l, m $(l < m)$ are roots of $ax^2 + bx + c = 0$, then $\lim_{x \to \alpha} \frac{|ax^2+bx+c|}{ax^2+bx+c} =$

(A) $\frac{|a|}{a}$, $\forall \alpha \in \mathbf{R}$
(B) $\frac{-|a|}{a}$, when $\alpha \notin (l, m)$
(C) $\frac{-|a|}{a}$, when $\alpha \in (l, m)$
(D) $\frac{|a|}{a}$, when $\alpha \in (l, m)$

Answer: (C) $\frac{-|a|}{a}$, when $\alpha \in (l, m)$ · The council's preliminary key

Q249 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

Let $f(x) = \begin{cases} \frac{1}{|x|}, & \text{for } |x| > 1 \\ ax^2 + b, & \text{for } |x| \leq 1 \end{cases}$. If $\lim_{x \to 1} f(x)$ and $\lim_{x \to -1} f(x)$ exist, then the possible values for a and b are

(A) $a = b = 1$
(B) $a = -\frac{1}{2}, b = -\frac{3}{2}$
(C) $a = \frac{3}{2}, b = -\frac{1}{2}$
(D) $a = \frac{1}{2}, b = -\frac{3}{2}$

Answer: (C) $a = \frac{3}{2}, b = -\frac{1}{2}$ · The council's preliminary key

Q250 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

$\frac{d}{dx}\left(\lim_{y \to 2} \frac{1}{y-2}\left(\frac{1}{x} - \frac{1}{x+y-2}\right)\right) =$

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

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

Q251 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

If $f(x) = \begin{cases} \frac{x^2 \log(\cos x)}{\log(1+x)}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then at $x = 0$, $f(x)$ is

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(A) not continuous
(B) continuous but not differentiable
(C) differentiable
(D) not continuous, but differentiable

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

Q252 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

If $f(x) = \lim_{n\to\infty} n\left(x^{1/n} - 1\right)$, then for $x, y > 0$, $f(xy) =$

(A) $f(x) \cdot f(y)$
(B) $f(x) + f(y)$
(C) $f(x) - f(y)$
(D) $\dfrac{f(x)}{f(y)}$

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

Q253 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

$\lim\limits_{x\to 2} \dfrac{\sqrt{1 - \cos\{2(x-2)\}}}{x-2}$

(A) Equals to $-\sqrt{2}$
(B) Equals to $\frac{1}{\sqrt{2}}$
(C) Does not exist
(D) Equals to $\sqrt{2}$

Answer: (C) Does not exist · The council's preliminary key

Q254 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

If $f(2) = 14$ and $f'(x) = 14$, then $\lim\limits_{x\to 2} \dfrac{xf(2) - 2f(x)}{x-2} =$ _____

(A) 14
(B) -12
(C) -14
(D) 13

Answer: (C) -14 · The council's preliminary key

Q255 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

If $f(a) = a^2$; $\phi(a) = b^2$ and $f'(a) = 3\phi'(a)$, then $\lim\limits_{x\to a} \dfrac{\sqrt{f(x)} - a}{\sqrt{\phi(x)} - b} =$

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(A) $\frac{b^2}{a^2}$
(B) $\frac{b}{a}$
(C) $\frac{2b}{a}$
(D) $\frac{3b}{a}$

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

Q256 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

$\lim_{x\to 0}\left(\frac{\sin ax}{\tan bx}\right) =$

(A) ab
(B) $\frac{a}{b}$
(C) $\frac{b}{a}$
(D) 1

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

Q257 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

$\lim_{x\to(-3)}\left(\frac{\mathrm{Sin}^{-1}(x+3)}{x^2+3x}\right) =$

(A) 0
(B) ∞
(C) -3
(D) $\frac{-1}{3}$

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

Q258 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

If the function defined by $f(x) = \frac{\log(1+x)^{1+x}}{x^2} - \frac{1}{x}$, $x \neq 0$ is continuous at $x = 0$, then $6f(0) =$ _____

(A) 2
(B) 3
(C) 1
(D) 6

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

Q259 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

$\lim_{x\to\infty}\left(\frac{2+\sin x}{x^2+3}\right) =$

(A) 0
(B) 1
(C) -1
(D) ∞

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

Q260 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

If $[.]$ here denotes the greatest integer function, $\lim_{x\to 0} x^7\left[\frac{1}{x^3}\right] =$

(A) 1
(B) 0
(C) -1
(D) Does not exist

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

Q261 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

If $\lim_{x\to 0}\{1+x\log(1+a^2)\}^{1/x} = 2a\sin^2\theta$, $a>0$ and $\theta \in R$, then _____

(A) $\theta = n\pi \pm \frac{\pi}{2}, (n \in Z)$
(B) $\theta = 2n\pi \pm \frac{\pi}{2}, (n \in Z)$
(C) $\theta = n\pi + \frac{\pi}{2}, (n \in Z)$
(D) $\theta = n\pi \pm \frac{\pi}{4}, (n \in Z)$

Options (1) or (2) or (3) were accepted. More than one answer was accepted. · The council's preliminary key

Q262 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

The set of all points where the function $f(x) = 2x|x|$ is differentiable is _____

(A) $(-\infty, \infty)$
(B) $(-\infty, 0) \cup (0, \infty)$
(C) $(0, \infty)$
(D) $[0, \infty)$

Answer: (A) $(-\infty, \infty)$ · The council's preliminary key

Q263 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

If $\lim_{n\to\infty} \frac{1-(10)^n}{1+(10)^{n+1}} = \frac{-\alpha}{10}$, then $\alpha =$ _____

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

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

Q264 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

$\lim_{x\to\infty}\left(\frac{x+6}{x+1}\right)^{x+4} =$

(A) e^4
(B) e^6
(C) e^5
(D) e

Answer: (C) e^5 · The council's preliminary key

Q265 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

$\lim_{x\to 0^+}\frac{x\,\mathrm{Sin}^{-1}\left(\frac{2x}{1+x^2}\right)}{\mathrm{Cos}^{-1}\left(\frac{1-x^2}{1+x^2}\right)\mathrm{Tan}^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)} =$

(A) $\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{4}$
(D) $\frac{1}{6}$

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

Q266 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

A function $f: R \to R$ satisfies the relation $f(x+y) = f(x)\cdot f(y), \forall\, x, y \in R$ and $f(x) \neq 0, \forall\, x \in R$. If 'f' is differentiable at $x = 0$, $f'(0) = 4$ and $f(6) = 3$, then $f'(6) =$ _____

(A) 0
(B) 12
(C) 3
(D) 6

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

Q267 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

If $[.]$ denotes the Greatest integer function, then $f(x) = [x]^2 - [x^2]$ is discontinuous at _____

(A) All integers
(B) All integers except 0 and 1
(C) All integers except 1
(D) All integers except 0

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

Q268 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

The limit $\lim_{x\to 1}\frac{\sqrt{1-\cos 2(x-1)}}{x-1}$ _____

(A) exists and is equal to $\sqrt{2}$
(B) exists and is equal to $-\sqrt{2}$
(C) does not exist
(D) exists and is equal to $(1/2)$

Answer: (C) does not exist · The council's preliminary key

Q269 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

If $f(x)$, defined as given below, is continuous on R, then the value of $a+b=$ _____

$$f(x)=\begin{cases}\sin x, & x\le 0\\ x^2+a, & 0<x<1\\ bx+3, & 1\le x\le 3\\ -3, & x>3\end{cases}$$

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

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

Q270 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

If the function $f(x)$, defined below, is continuous everywhere, then 'k' equals _____

$$f(x)=\begin{cases}\dfrac{2^x-1}{\sqrt{1+x}-1}, & -1\le x<\infty\\ k, & x=0\end{cases}$$

(A) $\frac{1}{2}\log_e 2$
(B) $\log_e 4$
(C) $\log_e 8$
(D) $\log_e 2$

Answer: (B) $\log_e 4$ · The council's preliminary key

Q271 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

$$\lim_{x\to 0}\frac{\tan(x)+4\tan(2x)-3\tan(3x)}{x^2\tan(x)}=$$

(A) 8

(B) -8

(C) 16

(D) -16

Answer: (D) -16 · The council's preliminary key

Q272 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

$$\lim_{x\to 0}\frac{8}{x^8}\left(1-\cos\left(\frac{x^2}{2}\right)-\cos\left(\frac{x^2}{4}\right)+\cos\left(\frac{x^2}{2}\right)\cdot\cos\left(\frac{x^2}{4}\right)\right)=$$

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

(B) $\frac{1}{8}$

(C) $\frac{1}{16}$

(D) $\frac{1}{32}$

Answer: (D) $\frac{1}{32}$ · The council's preliminary key

Q273 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

$$\lim_{n\to\infty}\frac{n(2n+1)^2}{(n+2)(n^2+3n-1)}=$$

(A) 0

(B) 4

(C) 2

(D) ∞

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

Q274 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

If the function $f(x)$, defined below, is continuous on the interval $[0,8]$, then _____

$$f(x)=\begin{cases}x^2+ax+b, & 0\le x<2\\ 3x+2, & 2\le x\le 4\\ 2ax+5b, & 4<x\le 8\end{cases}$$

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(A) $a = 3, b = -2$

(B) $a = -3, b = 2$

(C) $a = -3, b = -2$

(D) $a = 3, b = 2$

Answer: (A) $a = 3, b = -2$ · The council's preliminary key

Q275 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

If $f(x)$, defined below, is continuous at $x = 4$, then _____

$$f(x) = \begin{cases} \dfrac{x-4}{|x-4|} + a, & x < 4 \\ a + b, & x = 4 \\ \dfrac{x-4}{|x-4|} + b, & x > 4 \end{cases}$$

(A) $a = 0$ & $b = 0$

(B) $a = 1$ & $b = 1$

(C) $a = -1$ & $b = 1$

(D) $a = 1$ & $b = -1$

Answer: (D) $a = 1$ & $b = -1$ · The council's preliminary key

Q276 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If $\lim_{x\to\infty}\left(\frac{11x^3-3x+4}{13x^3-5x^2-7}\right) = \frac{a}{b}$ then the value of $a + b$ equals _____

(A) 11

(B) 13

(C) 8

(D) 24

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

Q277 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

$\lim_{x\to 1} \frac{(1-x)(1-x^2)\cdot\cdots\cdot(1-x^{2n})}{\{(1-x)(1-x^2)\cdot\cdots\cdot(1-x^n)\}^2} =$ _____, $\forall\, n \in N$

(A) ${}^{2n}P_n$

(B) ${}^{2n}C_n$

(C) $(2n)!$

(D) $\frac{(2n)!}{n!}$

Answer: (B) ${}^{2n}C_n$ · The council's preliminary key

Q278 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If $f(x) = \frac{\log_e(1+x^2(\tan x))}{\sin x^3}$, $x \neq 0$ is to be continuous at $x = 0$, then $f(0)$ must be equal to _____

(A) 1

(B) 0

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

(D) -1

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

Q279 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

$$\lim_{z\to 1}\frac{z^{(1/3)}-1}{z^{(1/6)}-1}=$$

(A) -1

(B) 1

(C) 2

(D) -2

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

Q280 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

$$f(x)=\begin{cases}\dfrac{72^x-9^x-8^x+1}{\sqrt{2}-\sqrt{1+\cos x}}, & x\neq 0\\ k\log 2\log 3, & x=0\end{cases}$$

Find the value of 'k' for which the function f is continuous.

(A) $\sqrt{2}$

(B) 24

(C) $18\sqrt{3}$

(D) $24\sqrt{2}$

Answer: (D) $24\sqrt{2}$ · The council's preliminary key

Q281 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

If the function $f(x)$, defined below is continuous in the interval $[0,\pi]$, then _____

$$f(x)=\begin{cases}x+a\sqrt{2}(\sin x), & 0\le x<\dfrac{\pi}{4}\\ 2x(\cot x)+b, & \dfrac{\pi}{4}\le x\le\dfrac{\pi}{2}\\ a(\cos 2x)-b(\sin x), & \dfrac{\pi}{2}<x\le\pi\end{cases}$$

(A) $a=\frac{\pi}{6}, b=\frac{\pi}{12}$
(B) $a=\frac{-\pi}{6}, b=\frac{\pi}{12}$
(C) $a=\frac{-\pi}{6}, b=\frac{-\pi}{12}$
(D) $a=\frac{\pi}{6}, b=\frac{-\pi}{12}$

Answer: (D) $a=\frac{\pi}{6}, b=\frac{-\pi}{12}$ · The council's preliminary key

Q282 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

$f(x)=\begin{cases}\frac{e^{ax}-e^{x}-x}{x^2}, & x\neq 0\\ \frac{3}{2}, & x=0\end{cases}$

Find the value of 'a' for which the function f is continuous.

(A) 1
(B) 0
(C) 4
(D) 2

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

Q283 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

The value of 'k' $(k>0)$, for which the function $f(x)=\frac{(e^x-1)^4}{\sin\left(\frac{x^2}{k^2}\right)\log\left(1+\frac{x^2}{2}\right)}$, where $x\neq 0$ and $f(0)=8$

_____

(A) 1
(B) 4
(C) 2
(D) 3

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

Q284 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

If $f''(x)$ is continuous at $x=0$ and $f''(0)=4$, then find the following value. $\lim_{x\to 0}\frac{2f(x)-3f(2x)+f(4x)}{x^2}=$

(A) 4
(B) 8
(C) 12
(D) 16

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

Q285 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

$$\lim_{x\to 0^-} \frac{\sqrt{\frac{1}{2}\left(1-\cos^2 x\right)}}{x} =$$

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

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

(C) -1

(D) does not exist

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

Q286 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

If the function defined by $f(x) = \begin{cases} \frac{2^x - 2^{-x}}{x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ is continuous at $x = 0$ then $e^k =$

(A) $\log\left(\frac{2}{e}\right)$

(B) $\log 4$

(C) 4

(D) 1

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

Q287 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

$$\lim_{x\to 0} \frac{2\sin x - \sin 2x}{x^3} =$$

(A) 1

(B) 0

(C) -1

(D) Does not exist

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

Q288 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

If $f : \mathbb{R} \to \mathbb{R}$, is defined as $f(x) = |x+1| + |x-1|$, then $f(x)$ is

(A) not differentiable at every real number
(B) not differentiable at -1 and 1 only
(C) not differentiable at -1, 0 and 1
(D) differentiable on $\mathbb{R}$

Answer: (B) not differentiable at -1 and 1 only · The council's preliminary key

Q289 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

If a, b are roots of the equation $px^2 + qx + r = 0$, then $\lim_{x \to b} \frac{1-\cos 2(px^2+qx+r)}{2(px-pb)^2} =$

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

Answer: (D) $a^2 - 2ab + b^2$ · The council's preliminary key

Q290 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

If $f : \mathbb{R} \to \mathbb{R}$ defined as $f(x) = \frac{x^3+2x^2+x+2}{x^2+x-2}$ (when $x \neq -2$) is continuous at $x = -2$, then $f(-2) =$

(A) 5
(B) $\frac{-5}{3}$
(C) 2
(D) $\frac{3}{5}$

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

Q291 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

Match the items given in List-A with those of the items of List-B

List-A
A) $|x| + |x-2|$
B) Cosec hx
C) $x - [x]$
D) $\sqrt{2-x}$

List-B
I) Right hand limit does not exist at $x = 2$
II) Continuous only for non-zero real values of x
III) Limit is zero for all real x
IV) Continuous for all real value of x
V) Discontinuous at all integral values of x

The correct match is

(A) A-I, B-IV, C-V, D-III
(B) A-V, B-I, C-II, D-IV
(C) A-IV, B-II, C-V, D-I
(D) A-III, B-I, C-IV, D-V

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

Q292 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

Suppose $f:\mathbb{R}\to\mathbb{R}$ defined as $f(x)=\begin{cases}[\cos\pi x], & x\le 1\\ 2\{x\}-1, & x>1\end{cases}$, where $[\cdot]$ and $\{\cdot\}$ denote the greatest integer function and the fractional part of x respectively, then at $x=1$

(A) right derivative is 2
(B) left derivative is 2
(C) right derivative is 0
(D) left derivative is -1

Answer: (A) right derivative is 2 · The council's preliminary key

Q293 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

If $f(x)=\begin{cases}\dfrac{\sin[x]}{[x]}, & [x]\neq 0\\ 0, & [x]=0\end{cases}$ where $[x]$ denotes the greatest integer less than or equal to x, then $\lim\limits_{x\to 0^-} f(x)$

(A) exist and equal to 1
(B) exist and equal to $\sin 1$
(C) exist and equal to $-\sin 1$
(D) Does not exist

Answer: (B) exist and equal to $\sin 1$ · The council's preliminary key

Q294 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

$$\lim_{x\to-\infty}\frac{3|x|^3-x^2+2|x|-5}{-5|x|^3+3x^2-2|x|+7}=$$

(A) $\dfrac{3}{5}$
(B) $\dfrac{-5}{7}$
(C) $\dfrac{5}{7}$
(D) $\dfrac{-3}{5}$

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

Q295 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

Let $f(x)=\begin{cases}\dfrac{\tan(2p-7)x+\tan 3x}{x}, & x<0\\ p-q, & x=0\\ q\left(\dfrac{\sqrt{x^2+x}-\sqrt{x}}{x^{3/2}}\right), & x>0\end{cases}$. If $f(x)$ is continuous at $x=0$, then $\dfrac{q}{p}=$

(A) $\dfrac{2}{3}$

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

(C) $\dfrac{3}{2}$

(D) $\dfrac{-3}{2}$

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

Q296 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

If $f(x)=x^2\sin\dfrac{1}{x}$, when $x\neq 0$ and $f(0)=0$, then $\mathrm{Lt}_{x\to 0}f'(x)$

(A) Does not exist

(B) 0

(C) ∞

(D) 1

Answer: (A) Does not exist · The council's preliminary key

Q297 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

Let $f(x)$ be differentiable function for all $x\in\mathbb{R}$ and $f(x+y)=f(x)+f(y)-3xy$. If $\lim\limits_{h\to 0}\dfrac{f(h)}{h}=7$, then $f'(x)=$

(A) $-3x+7$

(B) $3x-7$

(C) $3x+7$

(D) $-7-3x$

Answer: (A) $-3x+7$ · The council's preliminary key

Q298 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

Let a,b,c be three real numbers. If the function

$$f(x)=\begin{cases}\cos(2x+\pi) & \text{if } x\leq 0\\ ax^2+b & \text{if } 0<x<1\\ cx+4 & \text{if } 1\leq x\leq 2\\ 3a+1 & \text{if } x\geq 2\end{cases}$$

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is continuous everywhere, then $b^2 - bc + c^2 =$

(A) 133
(B) 157
(C) 43
(D) 31

Answer: (A) 133 · The council's preliminary key

Q299 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

$\underset{n\to\infty}{Lt}\ P\left(1+\frac{r}{100n}\right)^{tn} =$

(A) P
(B) $P\left(1+\frac{r}{100}\right)^{t}$
(C) $Pe^{\frac{rt}{100}}$
(D) $Pe^{\frac{r}{100}}$

Answer: (C) $Pe^{\frac{rt}{100}}$ · The council's preliminary key

Q300 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If $f:\mathbb{R}\to\mathbb{R}$ is a differentiable function at $a\in\mathbb{R}$ such that $f'(a)=af(a)$, then $\underset{x\to a}{Lt}\frac{xf(a)-af(x)}{x-a} =$

(A) $(1-a^2)f(a)$
(B) $\frac{f(a)}{a}$
(C) $af(a)$
(D) $\frac{f(a)}{1-a^2}$

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

Q301 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

$\underset{x\to 1}{\text{Lt}}\ \frac{\log x}{(1-x)} =$

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

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

Q302 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Let $f(x)=\frac{2-\sqrt{x+4}}{\sin 2x}$, $x\neq 0$. In order that $f(x)$ is continuous at $x=0$, $f(0)$ is to be defined as

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

Answer: (A) $\frac{-1}{8}$ · The council's preliminary key

Q303 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

If $f(x)=\begin{cases}1+\cos x, & x\le 0\\ a-x, & 0<x\le 2\\ x^2-b^2, & x>2\end{cases}$ is continuous everywhere, then $a^2+b^2=$

(A) 4
(B) 8
(C) 6
(D) 12

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

Q304 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Let $g:[-2,2]\to\mathbb{R}$ and $f:[-2,2]\to\mathbb{R}$ are two functions defined as $g(x)=\begin{cases}-1, & \text{if } -2\le x<0\\ x^2-1, & \text{if } 0\le x\le 2\end{cases}$ and $f(x)=|g(x)|+g(|x|)+2$. In the interval $(-2,2)$, f is not differentiable at $x=$

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

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

Q305 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Consider the following statements.
a) If a function is differentiable at a point 'p' then it is not continuous at 'p'
b) If a function is not continuous at $x=a$, then it is not differentiable at $x=a$
c) If $f(x)=|x|$ then $f(x)$ is not differentiable but continuous on $\mathbb{R}$
d) If $f(x)=x-[x]$, then $f'(1)=1$
Which of the above statements are (is) correct?

(A) Only (b)
(B) (b) and (c)
(C) Only (c)
(D) (c) and (d)

Answer: (B) (b) and (c) · The council's preliminary key

Q306 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

$\lim_{x\to 0} \dfrac{x^2 2^x - x^2 \sin x - x^2}{3^x + \cos x - 3^x \cos x - 1} =$

(A) $\dfrac{1}{\log 3}(\log 2 - 1)$
(B) $\dfrac{4}{\log 3}(1 - \log 2)$
(C) $\dfrac{4}{\log 3}(\log 2 - 1)$
(D) $\dfrac{2}{\log 3}(\log 2 - 1)$

Answer: (D) $\dfrac{2}{\log 3}(\log 2 - 1)$ · The council's preliminary key

Q307 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If $\lim_{x\to 2} \dfrac{3x^2 - ax + 5b}{x - 2} = 17$, then $ab =$

(A) -34
(B) -25
(C) -22
(D) 22

Answer: (D) 22 · The council's preliminary key

Q308 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

$\lim_{x\to 0} \dfrac{(1 - \cos 2x)}{x \tan 2x + \dfrac{2x}{3} \tan 3x} =$

(A) -6
(B) $\dfrac{1}{2}$
(C) 0
(D) $\dfrac{-6}{5}$

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

Q309 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

$\lim_{x\to 0} \frac{1-\cos x}{x^2} =$

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

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

Q310 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

$\lim_{n\to\infty} \left\{n - \sqrt{n^2-4n}\right\} =$

(A) 0
(B) 2
(C) 4
(D) 1

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

Q311 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

$\lim_{x\to\infty} \left(1+\frac{2}{x}\right)^{3x} =$

(A) e^6
(B) e^3
(C) e^2
(D) e

Answer: (A) e^6 · The council's preliminary key

Q312 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

Let $f : R \to R$ be a continuous function such that for any two real numbers x and y, $|f(x) - f(y)| \leq 10 \cdot |x-y|^{201}$ then

(A) $f(2019) = f(2020) + 1$
(B) $f(2019) + f(2022) = 2f(2021)$
(C) $f(2019) = f(2020) + 8$
(D) $f(2019) = f(2020) + 2$

Answer: (B) $f(2019) + f(2022) = 2f(2021)$ · The council's preliminary key

Q313 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

If $\lim_{x\to 3}\left(\frac{x^n-3^n}{x-3}\right)=108$ and $n\in N$ then the value of 'n' is

(A) 3
(B) 6
(C) 5
(D) 4

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

Q314 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

$\lim_{x\to 0}\frac{\left(1+\frac{x}{2}\right)^{5/7}-1}{x}=$

(A) $\frac{5}{7}$
(B) $\frac{10}{7}$
(C) $\frac{5}{14}$
(D) $\frac{5}{17}$

Answer: (C) $\frac{5}{14}$ · The council's preliminary key

Q315 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

If $f(x)=\begin{cases}4x-5, & x\le 2\\ x-k, & x>2\end{cases}$ then the value of 'k' if $\lim_{x\to 2} f(x)$ may exist is equal to

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

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

Q316 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

$$f(x)=\begin{cases}\frac{x-4}{|x-4|}+a, & x<4\\ a+b, & x=4\\ \frac{x-4}{|x-4|}+b, & x>4\end{cases}$$

If $f(x)$ given above is continuous at $x=4$, then find the values of 'a' and 'b'.

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(A) $a = 1,\ b = -1$

(B) $a = -1,\ b = 1$

(C) $a = 1,\ b = 1$

(D) $a = -1,\ b = -1$

Answer: (A) $a = 1,\ b = -1$ · The council's preliminary key

Q317 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

$\lim_{x\to 0} \frac{a^x - 1}{\sin(x)} =$

(A) $\log(a)$

(B) $\frac{1}{2}\log(a)$

(C) 0

(D) 1

Answer: (A) $\log(a)$ · The council's preliminary key

Q318 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

$\lim_{n\to\infty} \frac{2^2+4^2+6^2+\cdots+(2n)^2}{n^3} =$

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

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

(C) $\frac{3}{2}$

(D) $\frac{8}{7}$

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

Q319 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

$\lim_{x\to 1} \left((1-x)\tan\left(\frac{\pi x}{2}\right)\right) =$

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

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

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

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

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

Q320 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

Find the value of $\lim_{x\to 0} \frac{\sin(x^m)}{(\sin x)^n}$, given that $n < m$.

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(A) 2
(B) 1
(C) 0
(D) ∞

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

Q321 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

$f(x) = |\log_e |x||$ is differentiable at

(A) $x = 0$ only
(B) $x = 1$ only
(C) $x = -1$ only
(D) $R - \{0, \pm 1\}$

Answer: (D) $R - \{0, \pm 1\}$ · The council's preliminary key

Q322 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

$\lim_{n\to\infty} \frac{n!}{(n+1)! - n!} =$

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

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

Q323 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

$\lim_{x\to 0}(1+3x)^{2/x} =$

(A) 6
(B) e^6
(C) e^{-6}
(D) $e^{1/6}$

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

Q324 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

The function of $f(x) = |x| + \frac{|x|}{x}$ is

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(A) continuous at the origin
(B) discontinuous at the origin because $|x|$ is discontinuous there
(C) discontinuous at the origin because $\frac{|x|}{x}$ is discontinuous there
(D) discontinuous at the origin because both $|x|$ and $\frac{|x|}{x}$ are discontinuous are

Answer: (C) discontinuous at the origin because $\frac{|x|}{x}$ is discontinuous there · The council's preliminary key

Q325 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

A point in the domain that cannot be filled in so that the resulting function is continuous is called

(A) Removable Discontinuity
(B) Non- Removable Discontinuity
(C) Impossible Discontinuity
(D) Irrelevant Discontinuity

Answer: (B) Non- Removable Discontinuity · The council's preliminary key

Q326 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

If $a > 0,\ n \in R$, then $\lim\limits_{x \to a} x^n =$ _____

(A) na^n
(B) $(n-1)a^n$
(C) na^{n-1}
(D) a^n

Answer: (D) a^n · The council's preliminary key

Q327 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

$$\lim_{x \to 0} \frac{8}{\sin^8 x}\left\{1 - \cos\left(\frac{x^2}{2}\right) - \cos\left(\frac{x^2}{4}\right) + \cos\left(\frac{x^2}{2}\right)\cos\left(\frac{x^2}{4}\right)\right\} =$$

(A) $\frac{1}{16}$
(B) $\frac{1}{32}$
(C) $\frac{1}{64}$
(D) $\frac{1}{8}$

Answer: (B) $\frac{1}{32}$ · The council's preliminary key

Q328 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

If $\lim_{x \to \infty}\left(1 + \frac{p}{x}\right)^{qx} = e^9$ where $p, q \in N$ then $p + q =$

(A) 6
(B) 9
(C) 81
(D) 18

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

Q329 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

The function $y = \text{Sin}^{-1}(\cos x)$ is not differentiable at _____

(A) π only
(B) 2π only
(C) -2π only
(D) All options are correct

Answer: (D) All options are correct · The council's preliminary key

Q330 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

$\lim_{x\to\pi} \frac{1-\sin\frac{x}{2}}{\left(\cos\frac{x}{2}\right)\left(\cos\frac{x}{4}-\sin\frac{x}{4}\right)} =$

(A) $\frac{3}{\sqrt{2}}$
(B) $\frac{-1}{\sqrt{2}}$
(C) $\frac{1}{\sqrt{2}}$
(D) $\frac{5}{\sqrt{2}}$

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

Q331 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

If $f : \mathbb{R} \to \mathbb{R}$ and $g : \mathbb{R} \to \mathbb{R}$ be defined by

$$f(x) = \begin{cases} x+2, & x > 0 \\ 2-x, & x \le 0 \end{cases} \text{ and } g(x) = \begin{cases} x^2-2x-2, & 1 \le x < 2 \\ x-7, & x \ge 2 \\ x+5, & x < 1 \end{cases}$$

then $\lim\limits_{x\to 0} g \circ f(x)$

(A) is equal to -7
(B) is equal to -5
(C) is equal to 2
(D) does not exist

Answer: (B) is equal to -5 · Official TGCHE final key

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Q332 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

Define $f:\mathbb{R}\to\mathbb{R}$ by $f(x)=\begin{cases}(x-a)\dfrac{e^{1/(x-a)}-1}{e^{1/(x-a)}+1}, & \text{for } x\neq a\\ 0, & \text{at } x=a\end{cases}$

Then which one of the following is true?

(A) left and right limits of f at $x=a$ are equal and they are not equal to $f(a)$

(B) both left and right limits of f at $x=a$ exist and are not equal

(C) the function $f(x)$ is continuous at $x=a$

(D) the function $f(x)$ has a simple discontinuity at a point other than a

Answer: (C) the function $f(x)$ is continuous at $x=a$ · Official TGCHE final key

Q333 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

If $\mathrm{Lt}_{h\to0}\dfrac{f(x+h)-f(x)}{h}=e^x(x+1)$ and $f(0)=0$, then $\dfrac{d}{dx}\left(f(x)e^{-x}\right)+\dfrac{d}{dx}\left(\dfrac{f(x)}{x}\right)=$

(A) e^x+1

(B) x^2e^x+x

(C) xe^x+1

(D) x^2e^x

Answer: (A) e^x+1 · Official TGCHE final key

Q334 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

Let $f,g:\mathbb{R}\to\mathbb{R}$ be functions defined by $f(x)=\begin{cases}x\sin\left(\dfrac{1}{x}\right), & \text{for } x\neq0\\ 0, & \text{for } x=0\end{cases}$ and $g(x)=xf(x)$

Consider the following statements:

(I) : $f(x)$ is Continuous at $x=0$ but not differentiable at $x=0$

(II): $g(x)$ is differentiable at $x=0$, but $g^1(x)$ is not continuous at $x=0$.

Then, which one of the following is TRUE?

(A) (I) is true ; but (II) is false

(B) Both (I) and (II) are true

(C) (I) is false, but (II) is true

(D) Both (I) and (II) are false.

Answer: (B) Both (I) and (II) are true · Official TGCHE final key

Q335 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

Let $[x]$ denote the greatest integer less than or equal to x and $k\geq2$ be an integer. Then $\lim\limits_{x\to k}\dfrac{\sin\left(2\pi\left([x]-\left[\frac{x}{k}\right]\right)-x\right)+\sin k}{x-k}=$

(A) 1

(B) 0

(C) $-\cos k$

(D) $\sin k$

Answer: (C) $-\cos k$ · Official TGCHE final key

Q336 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

Define $f(x) = \begin{cases} 1+x, & 0 \le x \le 2 \\ 3-x, & 2 < x \le 3 \end{cases}$. If $f \circ f(x)$ is discontinuous at a and b in $[0,3]$ and $a < b$, then $2a + 3b =$

(A) 3

(B) 2

(C) 6

(D) 8

Answer: (D) 8 · Official TGCHE final key

Q337 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

$\lim\limits_{x \to 0} \dfrac{x \tan 4x - 2x \tan 2x}{(1-\cos 4x)^2} =$

(A) $\dfrac{1}{8}$

(B) $\dfrac{1}{4}$

(C) $\dfrac{1}{2}$

(D) 1

Answer: (B) $\dfrac{1}{4}$ · Official TGCHE final key

Q338 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

Assertion(A): $f(x) = |x-a| + |x-b|$, is continuous on $\mathbb{R}$.

Reason (R): $\dfrac{|x-\alpha|}{x-\alpha}$ is continuous at $x \in \mathbb{R} - \{\alpha\}$.

The correct option among the following is

(A) (A) is true, (R) is true and (R) is the correct explanation for A

(B) (A) is true, (R) is true but (R) is not the correct explanation for A

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

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

Answer: (B) (A) is true, (R) is true but (R) is not the correct explanation for A · Official TGCHE final key

Q339 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

$\lim_{x\to 0} \dfrac{1-\cos(1-\cos x)}{\sin^4 x} =$

(A) $\dfrac{1}{2}$
(B) $\dfrac{1}{4}$
(C) $\dfrac{1}{6}$
(D) $\dfrac{1}{8}$

Answer: (D) $\dfrac{1}{8}$ · Official TGCHE final key

Q340 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

At $x=0$, $f(x)=\begin{cases}\dfrac{x}{|x|+2x^2}, & x\neq 0\\ k, & x=0\end{cases}$ is

(A) Continuous only when $k=0$
(B) Discontinuous only when $k=0$
(C) Continuous for all values of k
(D) Discontinuous for all real values of k

Answer: (D) Discontinuous for all real values of k · Official TGCHE final key

Q341 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

If $\log(1+x)=x-\dfrac{x^2}{2}+\dfrac{x^3}{3}-\dfrac{x^4}{4}+\ldots\ldots\infty$ and $\lim\limits_{x\to 0}\left(\dfrac{\log(1+x)^{1+x}}{x^2}-\dfrac{1}{x}\right)=k$, then $12k=$

(A) 1
(B) 3
(C) 6
(D) 9

Answer: (C) 6 · Official TGCHE final key

Q342 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

If $f(x)=\begin{cases}k, & \text{for } x=1\\ \dfrac{(9x-1)(\sqrt{x}-1)}{3x^2+2x-5}, & \text{for } x\neq 1\end{cases}$ is continuous on $[0,\infty)$, then $k=$

(A) $\frac{1}{16}$
(B) $\frac{1}{8}$
(C) $\frac{1}{4}$
(D) $\frac{1}{2}$

Answer: (D) $\frac{1}{2}$ · Official TGCHE final key

Q343 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

$\lim_{x\to 0} \frac{1-\cos\left(x^2+\pi(x+2)\right)}{x^2} =$

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

Answer: (C) $\frac{\pi^2}{2}$ · Official TGCHE final key

Q344 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

The value of 'a' for which the function $f(x) = \begin{cases} \frac{1-\cos 4x}{x^2}, & x<0 \\ a, & x=0 \\ \frac{\sqrt{x}}{\sqrt{16+\sqrt{x}}-4}, & x>0 \end{cases}$ is continuous at $x=0$, is

(A) 2
(B) 8
(C) 4
(D) $\frac{1}{2}$

Answer: (B) 8 · Official TGCHE final key

Q345 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

$f:\mathbb{R}^+\to\mathbb{R}$ be an increasing function such that $f(x)>0$ for all x. If $\lim_{x\to\infty}\frac{f(9x)}{f(3x)}=1$, then $\lim_{x\to\infty}\frac{f(6x)}{f(3x)} =$

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

Answer: (A) 1 · Official TGCHE final key

EdLoop EAPCET

Q346 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

Let $[x]$ denotes the greatest integer less than or equal to x. Then $f(x)=\frac{1+\sin([\cos x])}{\cos([\sin x])}$ is

(A) continuous on $\left(0,\frac{\pi}{2}\right)$
(B) continuous on $(0,\pi)$
(C) discontinuous on $\left(\pi,\frac{3\pi}{2}\right)$
(D) continuous on $(\pi,2\pi)$

Answer: (A) continuous on $\left(0,\frac{\pi}{2}\right)$ · Official TGCHE final key

Q347 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

$$\lim_{x\to 0}\frac{x^4+x^3+x^2}{\mathrm{Sin}^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)\cdot \mathrm{Tan}^{-1}x}=$$

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

Answer: (C) 1 · Official TGCHE final key

Q348 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

If $f(x)=\lim_{n\to\infty}\left(\frac{\log(2+x)-x^{2n}\sin x}{1+x^{2n}}\right)$, $0\le x\le\frac{\pi}{2}$, $x\in\mathbb{R}$, then at $x=1$, $f(x)$ is

(A) differentiable
(B) discontinuous
(C) continuous
(D) continuous but not differentiable

Answer: (B) discontinuous · Official TGCHE final key

Q349 TS EAMCET 2019 · 6 May · Shift 1 MCQ

$$\lim_{x\to 0}\frac{\sqrt{x^2+100}-10}{x^2}=$$

(A) 0
(B) 0.1
(C) 0.05
(D) -0.05

Answer: (C) 0.05 · Official TGCHE final key

Q350 TS EAMCET 2019 · 6 May · Shift 1 MCQ

Let f and g be real-valued functions. If $\lim_{x\to 0}\frac{2f(x)-g(x)}{(f(x)+7)^{2/3}}=\frac{7}{4}$, $\lim_{x\to 0} f(x)=1$ and $\lim_{x\to 0} g(x)=\alpha$, then $h(x)=\begin{cases}\sin(\alpha x), & 0\le x\le \frac{\pi}{10}\\ \cos(2\alpha x), & \frac{\pi}{10}<x\le\frac{\pi}{5}\end{cases}$ is

(A) continuous at $x=\frac{\pi}{10}$ only
(B) discontinuous on $\left[0,\frac{\pi}{5}\right]$
(C) discontinuous at $x=\frac{\pi}{10}$
(D) continuous on $\left[0,\frac{\pi}{5}\right]$

Answer: (D) continuous on $\left[0,\frac{\pi}{5}\right]$ · Official TGCHE final key

Q351 TS EAMCET 2019 · 4 May · Shift 1 MCQ

$\lim_{x\to 0}\left(\frac{\sinh 2x}{2x}\right)^{\frac{1}{x^2}}=$

(A) 0
(B) $e^{\frac{1}{3}}$
(C) $e^{\frac{2}{3}}$
(D) $e^{\frac{4}{3}}$

Answer: (C) $e^{\frac{2}{3}}$ · Official TGCHE final key

Q352 TS EAMCET 2019 · 4 May · Shift 1 MCQ

If the function $f:\mathbb{R}\to\mathbb{R}$ defined by $f(x)=\begin{cases}a\left(\frac{1-\cos 2x}{x^2}\right), & \text{for } x<0\\ b, & \text{for } x=0\\ \frac{\sqrt{x}}{\sqrt{4+\sqrt{x}}-2}, & \text{for } x>0\end{cases}$ is continuous at $x=0$, then

$a+b=$

(A) 2
(B) 4
(C) 6
(D) 8

Answer: (C) 6 · Official TGCHE final key

Q353 TS EAMCET 2019 · 4 May · Shift 1 MCQ

Match the items of List - I with those of List - II
A) If $y=|x|+|x-2|$ then, at $x=2$, $\frac{dy}{dx}=$
B) If $f(x)=|\cos 2x|$ then $f'\left(\frac{\pi}{4}+\right)=$
C) If $f(x)=\sin\pi[x]$ where $[x]$ is the greatest integer function, then $f'(1-)=$

D) If $f(x) = \log|x-1|$, $x \neq 1$ then $f'\left(\frac{1}{2}\right) =$

I) 2

II) 0

III) -2

IV) does not exist

The correct matching is

(A) A-I, B-IV, C-II, D-III

(B) A-IV, B-III, C-I, D-II

(C) A-IV, B-I, C-III, D-II

(D) A-IV, B-I, C-II, D-III

Answer: (D) A-IV, B-I, C-II, D-III · Official TGCHE final key

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Q354 TS EAMCET 2019 · 4 May · Shift 2 MCQ

$\lim_{x\to\infty} x\left(\log\left(1+\frac{x}{2}\right) - \log\frac{x}{2}\right) =$

(A) 0

(B) 1

(C) 2

(D) e

Answer: (C) 2 · Official TGCHE final key

Q355 TS EAMCET 2019 · 4 May · Shift 2 MCQ

The set of values of x for which the function $f(x) = \log\left(\frac{x-1}{x+2}\right)$ is continuous, is

(A) $\mathbb{R}$

(B) $(-\infty,-2)\cup(0,\infty)$

(C) $(-\infty,-2)\cup(1,\infty)$

(D) $(-2,-1)$

Answer: (C) $(-\infty,-2)\cup(1,\infty)$ · Official TGCHE final key

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Q356 TS EAMCET 2019 · 4 May · Shift 2 MCQ

If the function $f:\mathbb{R}\to\mathbb{R}$, defined by $f(x) = \begin{cases} 5-3x, & \text{if } x \leq \frac{5}{3} \\ x^2-3x+20, & \text{if } x > \frac{5}{3} \end{cases}$, then 'f' is

(A) continuous at $x = \frac{5}{3}$

(B) differentiable at $x = \frac{5}{3}$

(C) differentiable at $x = 2$

(D) discontinuous at $x = -2$

Answer: (C) differentiable at $x = 2$ · Official TGCHE final key

Q357 TS EAMCET 2019 · 3 May · Shift 1 MCQ

$\lim_{x\to\infty}\left(\frac{2x^2+3x+4}{x^2-3x+5}\right)^{\frac{3|x|+1}{2|x|-1}} =$

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

Answer: (B) $2\sqrt{2}$ · Official TGCHE final key

Q358 TS EAMCET 2019 · 3 May · Shift 1 MCQ

If 'a' is the point of discontinuity of the function $f(x)=\begin{cases}\cos 2x & \text{for } -\infty<x<0\\ e^{3x} & \text{for } 0\le x<3\\ x^2-4x+3 & \text{for } 3\le x\le 6\\ \frac{\log(15x-89)}{x-6} & \text{for } x>6\end{cases}$ then,

$\lim_{x\to a}\frac{x^2-9}{x^3-5x^2+9x-9} =$

(A) 1
(B) 0
(C) 6
(D) 3

Answer: (A) 1 · Official TGCHE final key

Q359 TS EAMCET 2019 · 3 May · Shift 1 MCQ

Consider the function $f(x)=2x^3-3x^2-x+1$ and the intervals $\mathrm{I}_1=[-1,0]$, $\mathrm{I}_2=[0,1]$, $\mathrm{I}_3=[1,2]$, $\mathrm{I}_4=[-2,-1]$. Then,

(A) $f(x)=0$ has a root in the intervals I_1 and I_4 only
(B) $f(x)=0$ has a root in the intervals I_1 and I_2 only
(C) $f(x)=0$ has a root in every interval except in I_4
(D) $f(x)=0$ has a root in all the four given intervals

Answer: (C) $f(x)=0$ has a root in every interval except in I_4 · Official TGCHE final key

Q360 TS EAMCET 2019 · 3 May · Shift 2 MCQ

If $[x]$ is the greatest integer function, then $\lim_{x\to 2^+}\left(\frac{[x]^3}{3}-\left[\frac{x}{3}\right]^3\right) =$

(A) 0
(B) $\frac{64}{27}$
(C) $\frac{8}{3}$
(D) $\frac{7}{3}$

Answer: (C) $\frac{8}{3}$ · Official TGCHE final key

Q361 TS EAMCET 2019 · 3 May · Shift 2 MCQ

If the function defined by $f(x) = \begin{cases} \left(x^2 + e^{\frac{1}{2-x}}\right)^{-1}, & x \neq 2 \\ k, & x = 2 \end{cases}$ is right continuous at $x = 2$, then $k =$

(A) $-\frac{1}{4}$
(B) 0
(C) $\frac{1}{4}$
(D) 1

Answer: (C) $\frac{1}{4}$ · Official TGCHE final key

Q362 TS EAMCET 2019 · 3 May · Shift 2 MCQ

If $f(x) = \begin{cases} ax + b, & x \leq 1 \\ ax^2 + c, & 1 < x \leq 2 \\ \frac{dx^2 + 1}{x}, & x \geq 2 \end{cases}$ is differentiable on $\mathbb{R}$, then $ad - bc =$

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

Answer: (C) -1 · Official TGCHE final key

Q363 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

Let $[x]$ denote the greatest integer not exceeding x. If $l_1 = \lim_{x \to 2^+}(x^2 + [x])$, $l_2 = \lim_{x \to 3^-}(2x - [x])$ and $l_3 = \lim_{x \to \frac{\pi}{2}} \left(\frac{\cos x}{x - \frac{\pi}{2}}\right)$, then

(A) $l_2 < l_3 < l_1$
(B) $l_1 < l_3 < l_2$
(C) $l_1 < l_2 < l_3$
(D) $l_3 < l_2 < l_1$

Answer: (D) $l_3 < l_2 < l_1$ · Official APSCHE final key

Q364 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

If $\lim_{x\to 0}\frac{[(a-n)nx-\tan x]\sin nx}{x^2}=0,\ (n\neq 0)$ then the minimum possible positive value of a is

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

Answer: (C) 2 · Official APSCHE final key

Q365 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

If a function f is defined by:
$f(x)=0$, when $x=1$,
$=x^3-1$, when $1<x<\infty$,
$=x-1$, when $-\infty<x<1$, then at $x=1$, f is

(A) continuous and differentiable
(B) continuous but not differentiable
(C) discontinuous and differentiable
(D) discontinuous and not differentiable

Answer: (B) continuous but not differentiable · Official APSCHE final key

Q366 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

For $A\neq 0,\ x<0,\ \lim_{n\to\infty}\frac{\sin x-e^{nx}}{1+Ae^{nx}}=$

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

Answer: (B) $\sin x$ · Official APSCHE final key

Q367 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Define $f(x)=\begin{cases}\frac{\sqrt{1+px}-\sqrt{1-px}}{x}, & \text{if } -1\le x<0\\ \frac{2x+1}{x-2}, & \text{if } 0\le x\le 1\end{cases}$ If $\lim_{x\to 0}f(x)$ exists, then $p=$

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

Answer: (B) $-\frac{1}{2}$ · Official APSCHE final key

Q368 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Given $\sin x = \sum_{n=1}^{\infty}(-1)^{n-1}\frac{x^{2n-1}}{(2n-1)!}$. If the function $f(x)$ given by $f(x) = \frac{\cos(\sin x)-\cos x}{x^4}$ $(x \neq 0)$ and $f(0) = k$, is continuous at $x = 0$, then $k =$

(A) $\frac{1}{6}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) 0

Answer: (A) $\frac{1}{6}$ · Official APSCHE final key

Q369 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

$\lim\limits_{x\to\frac{\pi}{6}} \dfrac{\sin\left(x-\frac{\pi}{6}\right)}{\frac{\sqrt{3}}{2}-\cos x} =$

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

Answer: (C) 2 · Official APSCHE final key

Q370 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

The positive integer n for which $\lim\limits_{x\to 0}\dfrac{(\cos x-1)(\cos x-e^x)}{x^n}$ exists and is finite, is

(A) 4
(B) 3
(C) 2
(D) 1

Answer: (B) 3 · Official APSCHE final key

Q371 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

If $f(x) = \int_{-1}^{x}|t|\,dt$, $x \geq -1$, then

(A) f is continuous at $x = 0$ but f' is not continuous.
(B) both f and f' are continuous for all $x > -1$
(C) f is continuous for $x > -1$ but f' is not continuous.
(D) f and f' are differentiable at $x = 0$

Answer: (B) both f and f' are continuous for all $x > -1$ · Official APSCHE final key

EdLoop EAPCET

Q372 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

$\lim_{x\to 0} \frac{x^2(\tan 2x - 2\tan x)^2}{(1-\cos 2x)^4} =$

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

Answer: (D) $\frac{1}{4}$ · Official APSCHE final key

Q373 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

$\lim_{x\to -\infty} \left(\frac{6x^2-\cos 3x}{x^2+5} - \frac{5x^3+3}{\sqrt{x^6+2}}\right) =$

(A) 11
(B) 0
(C) -1
(D) 1

Answer: (A) 11 · Official APSCHE final key

Q374 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

The number of discontinuities in $\mathbb{R}$ for the function $f(x) = \frac{x-1}{x^3+6x^2+11x+6}$ is

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

Answer: (A) 3 · Official APSCHE final key

Q375 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

If $\alpha = \lim_{x\to 0} \frac{x\cdot 2^x - x}{1-\cos x}$ and $\beta = \lim_{x\to 0} \frac{x\cdot 2^x - x}{\sqrt{1+x^2}-\sqrt{1-x^2}}$, then

(A) $\alpha = 5\beta$
(B) $\alpha = 2\beta$
(C) $\beta = 2\alpha^2$
(D) $\beta = \frac{1}{6}\alpha$

Answer: (B) $\alpha = 2\beta$ · Official APSCHE final key

Q376 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

$\lim_{x\to\infty} \left[\sqrt{x^2+ax+b} - x\right]$ $(a < 0 < b)$

(A) depends on both a and b
(B) depends only on b
(C) depends only on a
(D) does not depend on a and b

Answer: (C) depends only on a · Official APSCHE final key

Q377 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

If α and β are such that the function $f(x)$ defined by $f(x) = \begin{cases} \alpha x^2 - \beta, & \text{for } |x| < 1 \\ \frac{-1}{|x|}, & \text{for } |x| \geq 1 \end{cases}$ is differentiable everywhere then the ordered pair $(\alpha, \beta) =$

(A) $\left(-\frac{1}{2}, -\frac{3}{2}\right)$
(B) $\left(\frac{1}{2}, -\frac{3}{2}\right)$
(C) $\left(\frac{1}{2}, \frac{3}{2}\right)$
(D) $\left(-\frac{1}{2}, \frac{3}{2}\right)$

Answer: (C) $\left(\frac{1}{2}, \frac{3}{2}\right)$ · Official APSCHE final key

Q378 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

If $\lim_{x\to\infty} \left\{ \frac{x^3+1}{x^2+1} - (\alpha x + \beta) \right\}$ exists and equal to 2 then the ordered pair (α, β) of real numbers is

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

Answer: (D) $(1, -2)$ · Official APSCHE final key

Q379 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

For $k > 0$, $\sum_{x=0}^{\infty} \frac{k^x}{x!} \lim_{n\to\infty} \frac{n!}{(n-x)!} \left(1 - \frac{k}{n}\right)^{n-x} \left(\frac{1}{n}\right)^x =$

(A) 0
(B) k
(C) x
(D) 1

Answer: (D) 1 · Official APSCHE final key

EdLoop EAPCET

Q380 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

Let $f : R \to R$ be the function defined by $f(x) = \begin{cases} 5, & \text{if } x \leq 1 \\ a + bx, & \text{if } 1 < x < 3 \\ b + 5x, & \text{if } 3 \leq x < 5 \\ 30, & \text{if } x \geq 5 \end{cases}$ then f is

(A) continuous if $a = 5$ and $b = 5$
(B) continuous if $a = 0,\ b = 5$
(C) continuous if $a = -5,\ b = 10$
(D) not continuous for any values of a and b

Answer: (D) not continuous for any values of a and b · Official APSCHE final key

Q381 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

Let $[x]$ denote the greatest integer less than or equal to x. Then the number of points where the function $y = [x] + |1 - x|,\ -1 \leq x \leq 3$ is not differentiable, is

(A) 1
(B) 2
(C) 3
(D) 4

Answer: (D) 4 · Official APSCHE final key

Q382 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If $\alpha = \lim_{x \to 0} \frac{x \cdot 2^x - x}{1 - \cos x}$ and $\beta = \lim_{x \to 0} \frac{x \cdot 2^x - x}{\sqrt{1+x^2} - \sqrt{1-x^2}}$ then

(A) $\alpha = \beta$
(B) $2\alpha = \beta$
(C) $\alpha = 2\beta$
(D) $\alpha = 3\beta$

Answer: (C) $\alpha = 2\beta$ · Official APSCHE final key

Q383 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If $f(x) = \begin{cases} \frac{x - |x|}{x}, & \text{when } x < 0 \\ 5x^2 + a, & \text{when } 0 \leq x \leq 1 \\ b\left(\frac{x^2 - 1}{x^2 - 3x + 2}\right), & \text{when } 1 < x < 3 \\ -14, & \text{when } x \geq 3 \end{cases}$ is a continuous function on $\mathbb{R}$, then $(a, b) =$

(A) $(2, -\frac{7}{2})$
(B) $(2, -14)$
(C) $(-\frac{7}{2}, -14)$
(D) $(2, 7)$

Answer: (A) $(2, -\frac{7}{2})$ · Official APSCHE final key

Q384 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

The number of points in the interval $(0, 2)$ at which $f(x) = |x - 0.5| + |x - 1| + \tan x$ is not differentiable is

(A) 1
(B) 2
(C) 3
(D) 4

Answer: (C) 3 · Official APSCHE final key

Q385 TS EAMCET 2018 · 7 May · Shift 1 MCQ

If $f(x)$ satisfies $97f(x) + mf\left(\frac{1}{x}\right) = 0$, where $f(x) = \lim_{n\to\infty} n\left(x^{1/n} - 1\right)$, $x > 0$, then the value of m is

(A) $\frac{1}{97}$
(B) 97
(C) 0
(D) 1

Answer: (B) 97 · The council's preliminary key

Q386 TS EAMCET 2018 · 7 May · Shift 1 MCQ

If $f(x) = \begin{cases} \frac{\sqrt{1+ax} - \sqrt{1-ax}}{x}, & -1 \le x < 0 \backslash [2mm] \frac{x^2+2}{x-2}, & 0 \le x \le 1 \end{cases}$ is continuous on $[-1, 1]$, then $a =$

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

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

Q387 TS EAMCET 2018 · 7 May · Shift 1 MCQ

The function that is not differentiable at $x = 1$ is

(A) $f_1(x) = |x|,\ -\infty < x < \infty$

(B) $f_2(x) = \begin{cases} 1+\sin(x-1), & -\infty < x \le 1 \\ x,\ x \ge 1 \end{cases}$

(C) $f_3(x) = \begin{cases} x^2+7x-7, & -\infty < x \le 1 \\ \dfrac{3x-1}{2},\ x \ge 1 \end{cases}$

(D) $f_4(x) = \begin{cases} |x-1|+|x-2|, & -\infty < x \le 1 \\ 1+x-x^3,\ x \ge 1 \end{cases}$

Answer: (C) $f_3(x) = \begin{cases} x^2+7x-7, & -\infty < x \le 1 \\ \dfrac{3x-1}{2},\ x \ge 1 \end{cases}$ · The council's preliminary key

Q388 TS EAMCET 2018 · 5 May · Shift 1 MCQ

$\lim_{x\to a} \frac{\sqrt{a+2x}-\sqrt{3a}}{\sqrt{x}-\sqrt{a}} =$

(A) $-\frac{5}{\sqrt{3}}$

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

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

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

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

Q389 TS EAMCET 2018 · 5 May · Shift 1 MCQ

If a function $f(x)$ defined by $f(x) = \begin{cases} ax+b, & x \le -1 \\ 2x^2+2bx-\frac{a}{2}, & -1 < x < 1 \\ 7, & x \ge 1 \end{cases}$ is continuous on $\mathbb{R}$ then $(a,b) =$

(A) $(-22,-3)$

(B) $(22,-3)$

(C) $(11,-6)$

(D) $(-22,-6)$

Answer: (A) $(-22,-3)$ · The council's preliminary key

Q390 TS EAMCET 2018 · 5 May · Shift 2 MCQ

$\lim\limits_{x\to 0} \dfrac{\cos 4x - 4\cos 2x + 3}{x^4} =$

(A) 4

(B) 8

(C) $\frac{1}{4}$

(D) $\frac{1}{8}$

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

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Q391 TS EAMCET 2018 · 5 May · Shift 2 MCQ

If $\alpha = \lim_{x\to 0} \frac{x\cdot 2^x - x}{1-\cos x}$ and $\beta = \lim_{x\to 0} \frac{x\cdot 2^x - x}{\sqrt{1+x^2}-\sqrt{1-x^2}}$ then

(A) $\alpha = \beta$
(B) $\alpha = 2\beta$
(C) $\alpha = \frac{\beta}{2}$
(D) $\alpha = 3\beta$

Answer: (B) $\alpha = 2\beta$ · The council's preliminary key

Q392 TS EAMCET 2018 · 5 May · Shift 2 MCQ

If $f(x) = \frac{2x}{4+3|x|}, x \in R$, then $f'(0) =$

(A) 0
(B) $\frac{1}{4}$
(C) $\frac{1}{2}$
(D) $\frac{3}{4}$

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

Q393 TS EAMCET 2018 · 5 May · Shift 2 MCQ

If f is a real function such that $f(4) = 4$ and $f'(4) = 16$, then $\lim_{x\to 4} \frac{\sqrt{f(x)}-2}{\sqrt{x}-2} =$

(A) 16
(B) 12
(C) 8
(D) 2

Answer: (A) 16 · The council's preliminary key

Q394 TS EAMCET 2018 · 4 May · Shift 1 MCQ

$\lim_{x\to-\infty} \frac{3|x|-x}{|x|-2x} - \lim_{x\to 0} \frac{\log(1+x^3)}{\sin^3 x} =$

(A) 1
(B) $\frac{1}{3}$
(C) $\frac{4}{3}$
(D) 0

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

Q395 TS EAMCET 2018 · 4 May · Shift 1 MCQ

If $f(x)=\begin{cases}\frac{x-2}{|x-2|}+a, & x<2\\ a+b, & x=2\\ \frac{x-2}{|x-2|}+b, & x>2\end{cases}$ is continuous at $x=2$, then $a+b=$

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

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

Q396 TS EAMCET 2018 · 4 May · Shift 1 MCQ

If $f(x)=\begin{cases}\frac{x^2\log(\cos x)}{\log(1+x^2)}, & x\neq 0\\ 0, & x=0\end{cases}$ then f is

(A) discontinuous at zero
(B) continuous but not differentiable at zero
(C) differentiable at zero
(D) not continuous and not differentiable at zero

Answer: (C) differentiable at zero · The council's preliminary key

Q397 TS EAMCET 2018 · 4 May · Shift 1 MCQ

Match the items given in List-A with those of the items of List-B

List-A

a) If $y=|x|+|x-2|$ then at $x=2$, $\frac{dy}{dx}=$

b) If $f(x)=|\cos 2x|$, then $f'\left(\frac{\pi}{4}+\right)=$

c) If $f(x)=\sin\pi[x]$ where $[\bullet]$ denotes the greatest integer function, then $f'(1-)=$

d) If $f(x)=\log|x-1|$, $x\neq 1$ then $f'\left(\frac{1}{2}\right)=$

List-B

i) 2

ii) 0

iii) -2

iv) does not exist

v) $\frac{1}{2}$

The correct answer is

(A) a-v, b-iii, c-i, d-ii

(B) a-iv, b-ii, c-i, d-iii

(C) a-iv, b-i, c-ii, d-iii

(D) a-i, b-iii, c-iv, d-ii

Answer: (C) a-iv, b-i, c-ii, d-iii · The council's preliminary key

Q398 TS EAMCET 2018 · 4 May · Shift 2 MCQ

The number of points at which the function $f(x)=\frac{\sqrt{11+|x|-6\sqrt{2+|x|}}}{6-2\sqrt{2+|x|}}$ is discontinuous in $(-\infty,\infty)$ is

(A) 1

(B) 0

(C) 2

(D) 3

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

Q399 TS EAMCET 2018 · 4 May · Shift 2 MCQ

If $f(x)=\begin{cases}\frac{\sqrt{1+px}-\sqrt{1-px}}{x}, & -1\le x<0\\ [2mm]\frac{2x+1}{x-2}, & 0\le x\le 1\end{cases}$ is continuous on $[-1,1]$, then $p=$

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

(B) $-\frac{1}{4}$

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

(D) 2

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

Q400 TS EAMCET 2018 · 4 May · Shift 2 MCQ

If $f:\mathbb{R}\to\mathbb{R}$ is such that $f(3)=16,\ f'(3)=4$, then $\lim\limits_{x\to 3}\frac{xf(3)-3f(x)}{x-3}=$

(A) 4
(B) 6
(C) 8
(D) 12

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

Q401 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

The smallest positive root of the equation $\tan x - x = 0$ lies in the interval

(A) $\left(0, \frac{\pi}{2}\right)$
(B) $\left(\frac{\pi}{2}, \pi\right)$
(C) $\left(\pi, \frac{3\pi}{2}\right)$
(D) $\left(\frac{3\pi}{2}, 2\pi\right)$

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

Q402 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

$\lim_{x\to 0} \frac{\sqrt{1+x\sin x}-\sqrt{\cos x}}{\tan^2 2x} =$

(A) 3
(B) $\frac{3}{2}$
(C) $\frac{3}{4}$
(D) $\frac{3}{16}$

Answer: (D) $\frac{3}{16}$ · The council's preliminary key

Q403 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

If the function f defined by $f(x) = \begin{cases} \cos x & \text{if } x \le 0, \\ 3x+\alpha & \text{if } 0 < x < 2, \\ \beta x + 3 & \text{if } 2 \le x \le 4, \\ 11 & \text{if } x > 4 \end{cases}$ where α and β are real constants, is continuous on $\mathbb{R}$, then $\alpha^2 + \beta^2 =$

(A) 3
(B) 9
(C) 5
(D) 1

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

Q404 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

If $f : [0,3] \to [0,3]$ is defined by $f(x) = \begin{cases} 1+x, & 0 \le x \le 2 \\ 3-x, & 2 < x \le 3 \end{cases}$ then $f \circ f$ is

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(A) Continuous at $x = 1$

(B) Continuous at $x = 2$

(C) Discontinuous at $x = 1$ and $x = 2$

(D) Continuous on $[0, 3]$

Answer: (C) Discontinuous at $x = 1$ and $x = 2$ · The council's preliminary key

Q405 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

If α and β are the roots of the equation $ax^2 + bx + c = 0$, then $\lim_{x\to\alpha} \frac{1-\cos\left(ax^2+bx+c\right)}{(x-\alpha)^2} =$

(A) $\frac{a^2(\alpha-\beta)^2}{4}$

(B) 1

(C) $\frac{a(\alpha-\beta)}{2}$

(D) $\frac{a^2(\alpha-\beta)^2}{2}$

Answer: (D) $\frac{a^2(\alpha-\beta)^2}{2}$ · The council's preliminary key

Q406 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

$\lim_{x\to0} \left(\frac{4^x-1}{2^x-1} - \frac{\sqrt{4+3x}-2}{x}\right) =$

(A) 0

(B) $\frac{5}{4}$

(C) $\log 2 - 3$

(D) $\frac{\log 4}{\log 2} - 3$

Answer: (B) $\frac{5}{4}$ · The council's preliminary key

Q407 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

Define the function $f : \mathbb{R} \to \mathbb{R}$ by $f(x) = \begin{cases} (1+3x)^{\frac{4}{x}}, & \text{if } x \neq 0, \\ a, & \text{if } x = 0. \end{cases}$ If f is continuous, then $\log a =$

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

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

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

(D) 12

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

Q408 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

If $f : [0, 2) \to \mathbb{R}$ is defined by $f(x) = \begin{cases} 1 + \frac{2x}{k} & \text{for } 0 \leq x < 1 \\ kx & \text{for } 1 \leq x < 2 \end{cases}$ where $k > 0$, and f is such that $\lim_{x\to1^-} f(x) = \lim_{x\to1^+} f(x)$, then the value of k^2 is

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

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

Q409 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

If the function $f:\mathbb{R}\to\mathbb{R}$ defined by $f(x)=\begin{cases}\frac{\sin(a+1)x+\sin x}{x} & ,x<0\\ b & ,x=0\\ \frac{\sqrt{x+x^2}-\sqrt{x}}{x^{3/2}} & ,x>0\end{cases}$ is continuous on $\mathbb{R}$, then $a+b=$

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

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

Q410 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

Let f be defined on $D=\mathbb{R}-\{-1,1\}$ by $f(x)=\frac{|x|}{1-|x|}$. Then

(A) f is differentiable on D
(B) f is differentiable on D except at $x=0$
(C) f is continuous but not differentiable on D
(D) f is differentiable but not continuous on D

Answer: (B) f is differentiable on D except at $x=0$ · The council's preliminary key

Q411 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

$\cos\left[\lim_{x\to\infty}\frac{2\pi|x|+\pi x}{|x|-3x}+\lim_{x\to 0}\frac{\cos\left(\frac{\pi}{2}\cos^2 x\right)}{x^2}\right]=$

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

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

Q412 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

$\lim_{n\to\infty}\frac{\left[6^2+12^2+18^2+\ldots+(6n)^2\right]^2}{[5+10+15+\ldots+5n][2^3+4^3+6^3+\ldots+8n^3]}=$

(A) $\frac{4}{5}$
(B) $\frac{144}{5}$
(C) $\frac{4}{25}$
(D) $\frac{144}{25}$

Answer: (B) $\frac{144}{5}$ · The council's preliminary key

Q413 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

If $[x]$ denotes the greatest integer not exceeding the number x, then $f(x)$ defined by $f(x) = \begin{cases} [x], & \text{if } x < 2 \\ [x]-1, & \text{if } x \geq 2 \end{cases}$ is continuous in the interval

(A) $[1,2) \cup (2,3]$
(B) $[1,3)$
(C) $(1,3)$
(D) $\mathbb{R}$

Options (2) or (3) were accepted. More than one answer was accepted. · The council's preliminary key

Q414 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

If a function f defined by $f(x) = \begin{cases} \frac{1-\sqrt{2}\sin x}{\pi-4x} & \text{if } x \neq \frac{\pi}{4} \\ k & \text{if } x = \frac{\pi}{4} \end{cases}$ is continuous at $x = \frac{\pi}{4}$, then $k =$

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

Answer: (A) $\frac{1}{4}$ · The council's preliminary key

Q415 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

$\lim\limits_{x \to \frac{\pi}{2}} \frac{1+\cos 2x}{\cot 3x \left(3^{\sin 2x}-1\right)} =$

(A) $\frac{1}{3\log 9}$
(B) $\frac{2}{3\log 3}$
(C) $\frac{1}{3\log 3}$
(D) $\frac{3}{\log 3}$

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

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Q416 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

$$\lim_{n\to\infty} n^{-nk}\left\{(n+1)\left(n+\frac{1}{2}\right)\left(n+\frac{1}{2^2}\right)\cdots\left(n+\frac{1}{2^{k-1}}\right)\right\}^n =$$

(A) 2

(B) $e^{2\left(1-\frac{1}{2^k}\right)}$

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

(D) e^2

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

Q417 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

If a and b $(a > b)$ are points of discontinuity of the function

$$f(x) = \begin{cases} 3-2x^2, & \text{for } x \le 0 \\ 2x+3, & \text{for } 0 < x \le 1 \\ 2x^2-3x, & \text{for } 1 < x < 2 \\ 2x-3, & \text{for } 2 \le x < 3 \\ |x|, & \text{for } x \ge 3 \end{cases}$$

then $3a - b =$

(A) 3

(B) 7

(C) 5

(D) 1

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

Q418 TS EAMCET 2017 · 12 May · Offline MCQ

$$\lim_{y\to 1}\left(\frac{1}{y^2-1}-\frac{2}{y^4-1}\right) =$$

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

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

(C) $\frac{1}{4}$

(D) 0

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

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Q419 TS EAMCET 2017 · 12 May · Offline MCQ

If $f(x)=\begin{cases}\sin x & \text{if } x\le 0\\ x^2+a^2 & \text{if } 0<x<1\\ bx+2 & \text{if } 1\le x\le 2\\ 0 & \text{if } x>2\end{cases}$ is continuous on $\mathbb{R}$, then $a+b+ab=$

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

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

Q420 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

$\lim\limits_{x\to 0}\dfrac{(1-\cos 2x)(3+\cos x)}{x\tan 4x}=$

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

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

Q421 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

If $f:\mathbb{R}\to\mathbb{R}$ is defined by

$$f(x)=\begin{cases}x-1, & \text{for } x\le 1\\ 2-x^2, & \text{for } 1<x\le 3\\ x-10, & \text{for } 3<x<5\\ 2x, & \text{for } x\ge 5\end{cases}$$

then the set of points of discontinuity of f is

(A) $\mathbb{R}-\{1,3,5\}$
(B) $\{1,3,5\}$
(C) $\mathbb{R}-\{1,5\}$
(D) $\{1,5\}$

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

Q422 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

If $f(x)=\dfrac{\sqrt{\pi}-\sqrt{\text{Cos}^{-1}x}}{\sqrt{1+x}}$ for $x>-1$ then $\lim\limits_{x\to -1^+}f(x)=$

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

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

Q423 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

If $f:(-7,7)\to\mathbb{R}$ is defined by $f(x)=[x]$ for all $x\in(-7,7)$, then the number of discontinuities of f is

(A) 15
(B) 13
(C) 11
(D) 0

Answer: (B) 13 · The council's preliminary key

Q424 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

Define $f:\mathbb{R}\to\mathbb{R}$ by $f(x)=[x]+\sqrt{x-[x]}$ for $x\in\mathbb{R}$, where $[x]$ denotes the greatest integer function. Then the set of points at which f is continuous is

(A) $\mathbb{R}^+$
(B) $\mathbb{R}$
(C) $\mathbb{R}-\mathbb{Z}$
(D) $\{1,2,3,\ldots\}$

Answer: (B) $\mathbb{R}$ · The council's preliminary key

Q425 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

If α,β are the roots of the equation $ax^2+bx+c=0$, then $\lim_{x\to\alpha}\frac{1-\cos(ax^2+bx+c)}{(x-\alpha)^2}=$

(A) $a^2(\alpha-\beta)^2$
(B) $4a^2(\alpha-\beta)^2$
(C) $\frac{a^2}{2}(\alpha-\beta)^2$
(D) $2a^2(\alpha-\beta)^2$

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

Q426 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

If f is defined by $f(x)=\begin{cases}\dfrac{1-\cos ax}{x\sin x}, & (x\neq 0)\\ \dfrac{1}{2}, & (x=0)\end{cases}$ and f is continuous at $x=0$, then $a^2=$

(A) 1
(B) 2
(C) 3
(D) 4

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

Q427 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

If $f(9)=9$ and $f'(9)=4$, then $\lim\limits_{x\to 9}\dfrac{\sqrt{f(x)}-3}{\sqrt{x}-3}=$

(A) 2
(B) 3
(C) 9
(D) 4

Answer: (D) 4 · Checked by our team

Q428 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

The points at which the function $f(x)=|x-0.5|+|x-1|+\tan x$ does not have a derivative in the interval $(0,2)$ is

(A) $0.5, 1, 2$
(B) $0.5, \dfrac{\pi}{2}, 0$
(C) $1, \dfrac{\pi}{2}, 2$
(D) $0.5, 1, \dfrac{\pi}{2}$

Answer: (D) $0.5, 1, \dfrac{\pi}{2}$ · Checked by our team

Q429 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

If $\lim_{x\to 0}\frac{e^{2x}-1}{5x}=l,\ \lim_{x\to 1}\frac{2}{x-1}\log x=m$, then a cubic equation whose roots are $5l$, m and 1, is

(A) $x^3-3x^2+2=0$
(B) $x^3+5x^2-8x+2=0$
(C) $x^3-5x^2+8x-4=0$
(D) $x^3+3x^2-4=0$

Answer: (C) $x^3-5x^2+8x-4=0$ · The council's preliminary key

Q430 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

Define $f(x)=\begin{cases}\frac{1-\sin x}{(\pi-2x)^2}, & \text{if } x\neq\frac{\pi}{2}\\ k, & \text{if } x=\frac{\pi}{2}\end{cases}$

If $f(x)$ is continuous at $x=\frac{\pi}{2}$, then $k=$

(A) $-\frac{1}{8}$

(B) $\frac{1}{8}$

(C) $\frac{\pi}{8}$

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

Answer: (B) $\frac{1}{8}$ · The council's preliminary key

Q431 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

If $f(x)=\begin{cases}\frac{\cos ax-\cos bx}{x^2}, & x\neq 0\\ \frac{1}{2}(a^2-b^2), & x=0\end{cases}$ where a,b are real and district (sic) constants, then

(A) f is discontinuous at $x=0$

(B) f is continuous at $x=0$

(C) $\lim\limits_{x\to 0} f(x)$ does not exist

(D) $f(0)$ is not defined

Answer: (A) f is discontinuous at $x=0$ · The council's preliminary key

Q432 TS EAMCET 2016 · 15 May · Offline MCQ

$\lim_{x\to\infty}\left[\frac{x^2+x+3}{x^2-x+2}\right]^x=$

(A) ∞

(B) e

(C) e^4

(D) e^2

Answer: (D) e^2 · Official TGCHE final key

Q433 TS EAMCET 2016 · 15 May · Offline MCQ

The values of p and q so that the function

$f(x)=\begin{cases}(1+|\sin x|)^{p/\sin x}, & \frac{-\pi}{6}<x<0\\ q, & x=0\\ e^{\sin 2x/\sin 3x}, & 0<x<\frac{\pi}{6}\end{cases}$

is continuous at $x=0$ is

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(A) $p = \frac{1}{3}, q = e^{2/3}$
(B) $p = 0, q = e^{2/3}$
(C) $p = \frac{2}{3}, q = e^{-2/3}$
(D) $p = -\frac{2}{3}, q = e^{2/3}$

Answer: (D) $p = -\frac{2}{3}, q = e^{2/3}$ · Official TGCHE final key

Q434 AP EAMCET 2016 · 29 Apr · Offline MCQ

The value(s) of x for which the function $f(x) = \begin{cases} 1-x, & x < 1 \\ (1-x)(2-x), & 1 \le x \le 2 \\ 3-x, & x > 2 \end{cases}$ fails to be continuous is (are)

(A) 1
(B) 2
(C) 3
(D) All real numbers

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

Q435 AP EAMCET 2016 · 29 Apr · Offline MCQ

$\lim\limits_{x \to 0} \dfrac{6^x - 3^x - 2^x + 1}{x^2} =$

(A) $(\log_e 2)\log_e 3$
(B) $\log_e 5$
(C) $\log_e 6$
(D) 0

Answer: (A) $(\log_e 2)\log_e 3$ · The council's preliminary key

Q436 AP EAMCET 2016 · 29 Apr · Offline MCQ

Define $f(x) = \begin{cases} x^2 + bx + c, & x < 1 \\ x, & x \ge 1 \end{cases}$. If $f(x)$ is differentiable at $x = 1$, then $(b - c) =$

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

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

Q437 AP EAMCET 2014 · 22 May · Offline MCQ

$\lim_{x \to 0} \frac{\sqrt{1+x^2} - \sqrt{1-x+x^2}}{3^x - 1} =$

(A) $\frac{1}{\log 3}$

(B) $\log 9$

(C) $\frac{1}{\log 9}$

(D) $\log 3$

Answer: (C) $\frac{1}{\log 9}$ · The council's preliminary key

Q438 AP EAMCET 2014 · 22 May · Offline MCQ

If $f:[-2,2]\to\mathbb{R}$ is defined by

$$f(x)=\begin{cases}\frac{\sqrt{1+cx}-\sqrt{1-cx}}{x} & \text{for } -2\le x<0\\ \frac{x+3}{x+1} & \text{for } 0\le x\le 2\end{cases}$$

is continuous on $[-2,2]$, then $c=$

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

(B) 3

(C) $\frac{3}{2}$

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

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

Q439 AP EAMCET 2013 · 10 May · Offline MCQ

$$\lim_{x\to 0}\frac{\tan^3 x-\sin^3 x}{x^5}=$$

(A) $\frac{5}{2}$

(B) $\frac{3}{2}$

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

(D) $\frac{2}{5}$

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

Q440 AP EAMCET 2012 · 12 May · Offline MCQ

$\lim_{x\to\infty}\left(\frac{x+6}{x+1}\right)^{x+4}=$

(A) e^4

(B) e^6

(C) e^5

(D) e

Answer: (C) e^5 · Official APSCHE final key

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Q441 AP EAMCET 2012 · 12 May · Offline MCQ

Let $f:\mathbb{R}\to\mathbb{R}$ be defined by

$$f(x)=\begin{cases}\alpha+\frac{\sin[x]}{x} & \text{if } x>0\\ 2 & \text{if } x=0\\ \beta+\left[\frac{\sin x-x}{x^3}\right] & \text{if } x<0\end{cases}$$

where $[y]$ denotes the integral part of y. If f is continuous at $x=0$, then $\beta-\alpha=$

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

Answer: (B) 1 · Official APSCHE final key

Q442 AP EAMCET 2011 · 8 May · Offline MCQ

$$\lim_{x\to 8}\frac{\sqrt{1+\sqrt{1+x}}-2}{x-8}=$$

(A) $\frac{3}{2}$
(B) $\frac{1}{4}$
(C) $\frac{1}{24}$
(D) (?)

Answer: (C) $\frac{1}{24}$ · The council's preliminary key

Q443 AP EAMCET 2011 · 8 May · Offline MCQ

If $[x]$ denotes the greatest integer not exceeding x and if the function f defined by $f(x)=$ $\begin{cases}\dfrac{a+2\cos x}{x^2} & (x<0)\\ b\tan\dfrac{\pi}{[x+4]} & (x\geq 0)\end{cases}$ is continuous at $x=0$, then the ordered pair $(a,b)=$

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

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

Q444 AP EAMCET 2011 · 8 May · Offline MCQ

If $f(x)=|x|+|\sin x|$ for $x\in\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$, then its left hand derivative at $x=0$ is

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

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

Q445 AP EAMCET 2010 · 30 May · Offline MCQ

$\lim_{x\to 0} \dfrac{\tan x - \sin x}{x^2} =$

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

Answer: (A) 0 · Official APSCHE final key

Q446 AP EAMCET 2010 · 30 May · Offline MCQ

If $f : \mathbb{R} \to \mathbb{R}$ defined by

$$f(x) = \begin{cases} \frac{1+3x^2-\cos 2x}{x^2}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at $x = 0$, then $k =$

(A) 1
(B) 5
(C) 6
(D) 0

Answer: (B) 5 · Official APSCHE final key

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