If $f(x) = \frac{1}{x} + 2$ and $g(x) = \frac{1}{x+1}$, then $\text{dom}(f \circ g) =$

(A) $(-\infty, \infty) - \{-3, -1\}$

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

(C) $(-\infty, \infty) - \{0\}$

(D) $(-\infty, \infty) - \{-2, -1\}$

(E) $(-\infty, \infty) - \{-1\}$

E

❖ $f \circ g = f\big(g(x)\big)$

$$f \circ g = \frac{1}{\left(\frac{1}{x+1}\right)} + 2$$

$$f \circ g = 3 + x$$

$$dom(f \circ g) = (-\infty, \infty)$$

$$dom(g) \to x + 1 = 0$$

$$x = -1$$

$$dom(g) = \mathbb{R} - \{-1\}$$

❖ $D_{f \circ g} = D_{ans} \cap D_g$

$$D_{f \circ g} = (-\infty, \infty) - \{-1\}$$

Question 5

Not yet answered

Marked out of 2.00

Flag question

If $f(x) = -2 + \ln(x + 4)$, then $f^{-1}(x) =$

(A) $-4 + e^{x-2}$

(B) $-4 + e^{x+2}$

(C) $4 + e^{x+2}$

(D) $4 + e^{x-2}$

(E) $-2 + e^{x+4}$

B

$$f(x) = -2 + \ln(x+4)$$

$$y = -2 + \ln(x+4)$$

$$x = -2 + \ln(y+4), \quad \text{swap } x \ \& \ y$$

$$x + 2 = \ln(y+4)$$

$$x + 2 = e^{\ln(y+4)}$$

$$e^{x+2} = y + 4$$

$$y = e^{x+2} - 4$$

$$f^{-1}(x) = -4 + e^{x+2}$$

Question **4**

Not yet answered

Marked out of 2.00

Flag question

The function $f(x)$ is stretched horizontally by a factor of 3 then is shifted 5 units to the right. Then the resulting function equals

(A) $3f(x-5)$

(B) $f(3x+5)$

(C) $f(\frac{1}{3}x-5)$

(D) $f(2x-15)$

(E) $f(\frac{1}{3}x-\frac{5}{3})$

C

Stretched horizontally by a factor of 3 ↘

$$f\left(\frac{x}{3}\right)$$

Shifted 5 units to the right↘

$$f\left(\frac{(x-5)}{3}\right) = f\left(\frac{x}{3} - \frac{5}{3}\right)$$

$\cos^{-1}(\cos(\frac{29\pi}{8})) =$

(A) $\frac{7\pi}{8}$

(B) $\frac{5\pi}{8}$

(C) $\frac{\pi}{8}$

(D) $\frac{3\pi}{8}$

(E) $\frac{29\pi}{8}$

D

❖ $\cos^{-1}\left(\cos\left(\frac{29\pi}{8}\right)\right)$

$$y = \cos^{-1}\left(\cos\left(\frac{29\pi}{8}\right)\right)$$

$$\cos y = \cos\left(\frac{29\pi}{8}\right)$$

❖ Range of $(\cos^{-1} x) = [0, \pi]$

❖ $\cos\ (2\pi - \theta) = \cos\theta$

$$\cos y = \cos\left(4\pi - \frac{29\pi}{8}\right)$$

$$\cos y = \cos\left(\frac{3\pi}{8}\right)$$

$$y = \frac{3\pi}{8}$$

D

Question 7

Not yet answered

Marked out of 2.00

Flag question

$\tan(\arcsin(x)) =$

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

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

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

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

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

E

$$\tan\left(\sin^{-1}(x)\right) = \frac{x}{\sqrt{1-x^2}}$$

Question 9
Not yet answered
Marked out of 2.00
Flag question

One of the following is an odd function

(A) $f(x) = x^2 \sin(x)$

(B) $f(x) = x^3 + |x|$

(C) $f(x) = x^5 + 1$

(D) $f(x) = x^3 + x^2$

(E) $f(x) = \sec(x)$

A

Quiz navigation

1 2 3 4 5 6 7 8 9 10

Finish attempt ...

Time left 0:08:00

- $f(-x) = f(x) \rightarrow even$
- $f(-x) = -f(x) \rightarrow odd$

- $odd */odd = even$
- $odd */even = odd$
- $even */even = even$

- $even \pm even = even$
- $even \pm odd = neither$, except for some special cases
- $odd \pm odd = odd$

$f(x) = x^2 * \cos x$

$even * odd = odd$

CALCULUS I / جميع الشعب

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Question 2
Not yet answered
Marked out of 2.00
Flag question

If $f(x) = 2\tan^{-1}(x) + 1$, then range(f) =

(A) $[-\pi + 1, \pi + 1]$

(B) $(-\pi + 1, \pi + 1)$

(C) $[1, 2\pi + 1]$

(D) $(1, 2\pi + 1)$

(E) $[-1, 3]$

B

Quiz navigation

Finish attempt ...

Time left 0:28:57

❖ $f(x) = 2 \cdot \tan^{-1}(x) + 1$

Range of $(\tan^{-1}(x)) = \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Range of $(2 \cdot \tan^{-1}(x)) = (-\pi, \pi)$

Range of $(2 \cdot \tan^{-1}(x) + 1) =$
$(-\pi + 1, \pi + 1)$

The solution of the equation $4^{(2x+1)} = 2^{(3x+4)}$ is $x =$

(A) 3

(B) −2

(C) 2

(D) −3

(E) 1

[14]

$$4^{2x+1} = 2^{3x+4}$$

$$2^{4x+2} = 2^{3x+4}$$

$$4x + 2 = 3x + 4$$

$x = 2$ C

$\cos(2\arcsin(x)) =$

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

(B) $1-x^2$

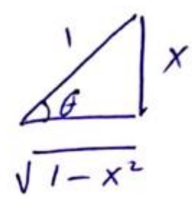
(C) $2x^2$

(D) $2x^2-1$

(E) $1-2x^2$

115 $\cos(2\sin^{-1}(x))$

$\sin^{-1}(x) = \theta \implies \sin(\theta) = x$



$\cos(2\sin^{-1}(x)) = \cos(2\theta) = 2\cos^2\theta - 1$

$= 2\left[\sqrt{1-x^2}\right]^2 - 1$

$= 2\left[1-x^2\right] - 1$

$= 1 - 2x^2$ E

If $f(x) = 2\sin^{-1}(x) + 1$, then range(f) =

(A) $[-\pi + 1, \pi + 1]$

(B) $(-\pi + 1, \pi + 1)$

(C) $[1, 2\pi + 1]$

(D) $(1, 2\pi + 1)$

(E) $[-1, 3]$

16

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

$-\pi/2 \le \sin^{-1}(x) \le \pi/2$

$-\pi \le 2\sin^{-1}(x) \le \pi$

$-\pi + 1 \le 2\sin^{-1}(x) + 1 \le \pi + 1$

A

If $\pi < \theta < \frac{3\pi}{2}$ and $\sin(\theta) = \frac{-1}{3}$, then $\cos(\theta) =$

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

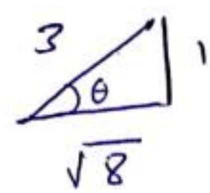
(B) $\frac{\sqrt{8}}{3}$

(C) $\frac{-2}{3}$

(D) $\frac{-\sqrt{8}}{3}$

(E) $\frac{-3}{\sqrt{8}}$

17 $\sin\theta = -1/3$



$\cos\theta = -\frac{\sqrt{8}}{3}$

ربع ثالث

If $f(x) = \frac{5x+1}{4x+9}$, then $f^{-1}(x) =$

(A) $\frac{5-4x}{9x+1}$

(B) $\frac{9x-1}{5-4x}$

(C) $\frac{9x-1}{4-5x}$

(D) $\frac{9x+1}{5+4x}$

(E) $\frac{x-9}{5-4x}$

18

$f(x) = \frac{5x+1}{4x+9}$

$y = \frac{5x+1}{4x+9} \Rightarrow y(4x+9) = 5x+1$

$\Rightarrow 4xy + 9y = 5x+1$

$\Rightarrow 4xy - 5x = 1-9y$

$x(4y-5) = 1-9y$

$x = \frac{1-9y}{4y-5} = \frac{9y-1}{5-4y}$ **B**

If $f(x) = \sqrt{x^2 - x - 6}$, then dom$(f)$ =

(A) $(-\infty, -2] \cup [3, \infty)$

(B) $(-\infty, -2) \cup (3, \infty)$

(C) $[-2, 3]$

(D) $(-\infty, 2] \cup [3, \infty)$

(E) $(-\infty, -3] \cup [2, \infty)$

119 $f(x) = \sqrt{x^2 - x - 6}$

$x^2 - x - 6 = 0$

$(x-3)(x+2) = 0$

$x = 3, -2$

++ −− ++ ; −2, 3

$(-\infty, -2] \cup [3, \infty)$ A

Only one of the following statements is (always) correct

(A) $\log_3(x) \leq \log_6(x)$ for all $x \geq 1$

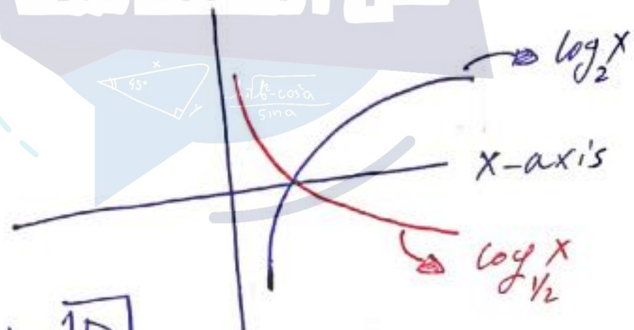
(B) $\text{Range}(\log_4(x)) = (0, \infty)$

(C) $\text{Dom}(\tan(x)) = (-\infty, \infty)$

(D) The graph of $f(x) = \log_2(x)$ can be obtained by reflecting the graph of $g(x) = \log_{\frac{1}{2}}(x)$ about the x-axis

(E) The graph of the parabola $x + (y-7)^2 = 9$ represents a function in x

20



Answer is D

The solution of the equation

$\log_2(2x+2) - \log_2(4x-2) = 1$ is $x =$

(A) 2

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

(C) -1

(D) 1

(E) 3

21 $\log_2 \frac{2x+2}{4x-2} = 1$

$2 = \frac{2x+2}{4x-2} \Rightarrow 8x - 4 = 2x + 2$

$6x = 6$

$x = 1$ D

If $\frac{\pi}{2} < \theta < \pi$ and $\sin(\theta) = \frac{1}{3}$, then $\sec(\theta) =$

(A) $\frac{-3}{\sqrt{8}}$

(B) $\frac{3}{\sqrt{8}}$

(C) $\frac{-3}{2}$

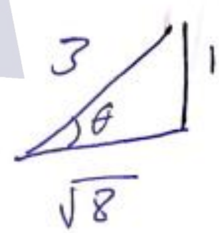
(D) $\frac{3}{2}$

(E) $\frac{-\sqrt{8}}{3}$

122

$\sin\theta = 1/3$

$\sec\theta = \frac{-3}{\sqrt{8}}$



If $f(x) = 4\sin^{-1}(x) + 1$, then range(f) =

(A) $[-3, 5]$

(B) $(-2\pi + 1, 2\pi + 1)$

(C) $(1, 4\pi + 1)$

(D) $[1, 4\pi + 1]$

(E) $[-2\pi + 1, 2\pi + 1]$

24

$$-\pi/2 \le \sin^{-1}(x) \le \pi/2$$

$$-2\pi \le 4\sin^{-1}(x) \le 2\pi$$

$$-2\pi + 1 \le 4\sin^{-1}(x) + 1 \le 2\pi + 1$$

E

Only one of the following statements is (always) correct

(A) $\text{Range}(f(x) = x^2 + 2x + 1) = (-\infty, \infty)$

(B) $f(x) = \frac{\sqrt{x}+x}{x^2+9}$ is a rational function

(C) $f(x) = |x| + 4x$ is a piecewise fuction

(D) $f(x) = \cos(x)$ is periodic with period 4π

(E) If a is a positive number, then $f(x) = a^x$ is a power function

E

25

piecewise يعني اقترانه متشعب والمطلق دائماً متشعب

الجواب C

Only one of the following statements is (always) correct

(A) Range(sec(x)) $= (-\infty, \infty)$

(B) $e^{-x} > 0$ for all x

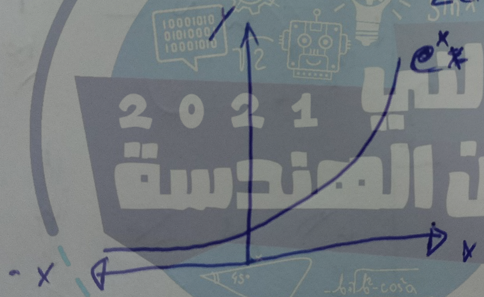
(C) Dom(tan(x)) $= (-\infty, \infty)$

(D) If $f(x) = \sqrt{-x}$, then $f(-3)$ is undefined

(E) $(\frac{1}{2})^x \leq 2^x$ for all x

B

8) $e^{-x} \neq$ exponental function will never be negative or zero



One of the following is a one-to-one function

(A) $f(x) = 5^{x^2}$

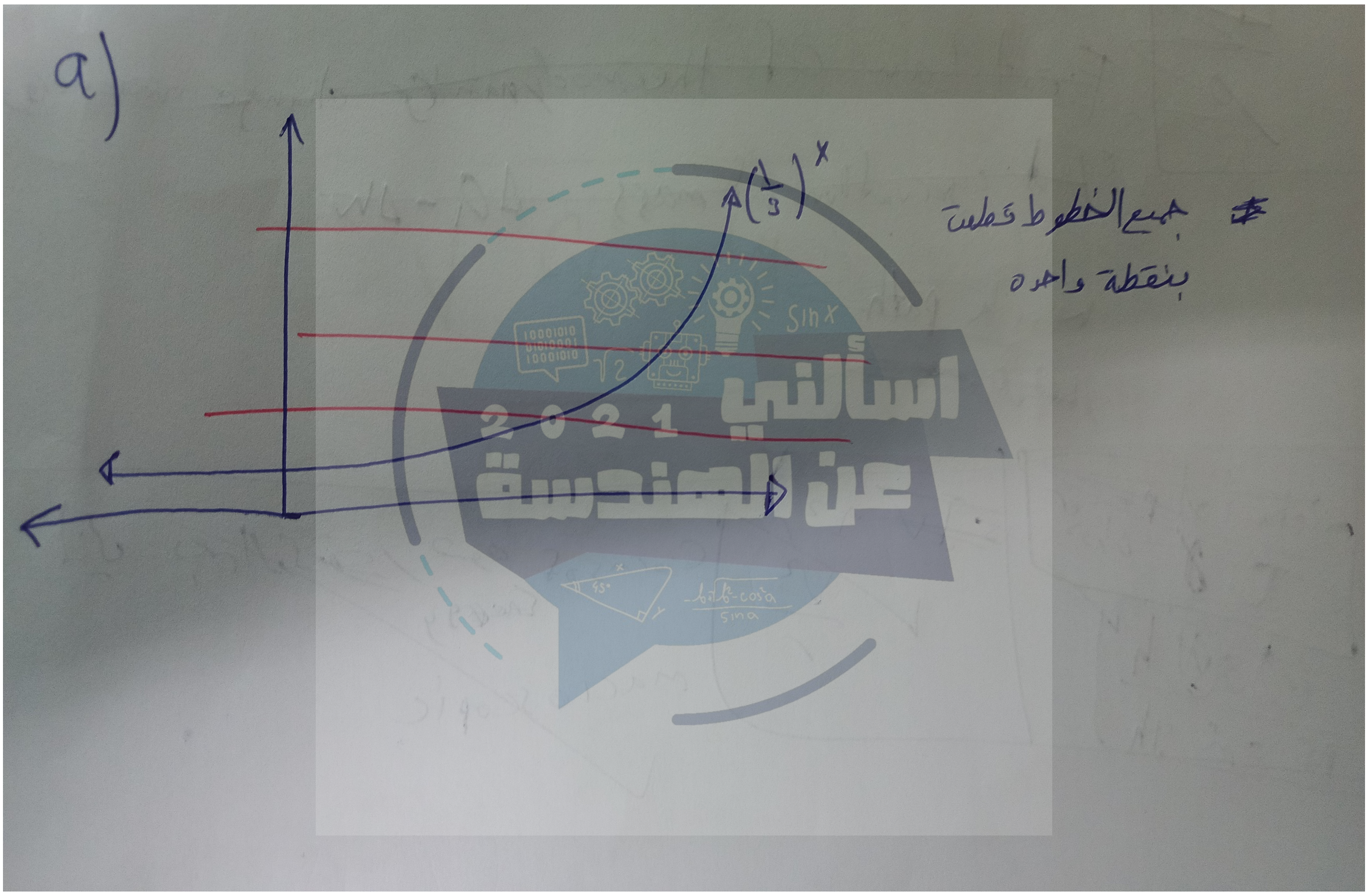
(B) $f(x) = \cos(x)$

(C) $f(x) = (\frac{1}{3})^x$

(D) $f(x) = \ln(x^2) + 6$

(E) $f(x) = x^2 + 1, \quad x \geq -23$

C


a)
$(\frac{1}{3})^x$
جميع الخطوط قطعت
بنقطة واحدة

Question 6

Not yet answered

Marked out of 2.00

Flag question

The solution(s) of the equation

$3^{2x} - 3^{x} = 12$ is (are)

(A) $x = \log_3(12)$ and $x = \log_3(13)$

(B) $x = \log_3(4)$ and $x = -\log_3(3)$

(C) $x = 4$

(D) $x = \log_3(12)$

(E) $x = \log_3(4)$

E

10)

$u = 3^x$

$u^2 - u = 12$

$u^2 - u - 12 = 0$

$(u - 4)(u + 3) = 0$

$u = 4 \qquad u = -3 \quad \times \; 3^x \neq \text{Negative}$

$3^x = 4$

$$\boxed{x = \log_3 4}$$

(E)

Not yet answered

Marked out of 2.00

Flag question

Only one of the following statements is (always) correct

(A) $(\frac{1}{4})^x \leq 4^x$ for all x

(B) If $y = f(x)$ is a function, then any horizontal line intersects the graph of $y = f(x)$ in at most one point

(C) The two functions $f(x) = \frac{x^2-49}{x-7}$ and $g(x) = x + 7$ are equal

(D) $\log_2(x) \leq \log_{[illegible]}(x)$ for all $x \geq 1$

(E) Domain$(5 - 9f(x))$ = Domain$(f(x))$

E

(A)

11) E

One of the following is an odd function

(A) $f(x) = x^3 + x^2$

(B) $f(x) = x^3 + |x|$

(C) $f(x) = x^5 + 1$

(D) $f(x) = x^2 \tan(x)$

(E) $f(x) = \sec(x)$

- ( ) (A)
- ( ) (B)
- ( ) (C)
- (•) (D)

12) $f(x) = -f(-x)$

$f(-x) = -x^2 \tan x$

$f(-x) = -f(x)$

odd (D)

$\cos^{-1}(\cos(\frac{-\pi}{3})) =$

(A) $\frac{2\pi}{3}$

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

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

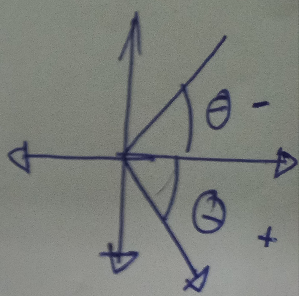
(D) $\frac{4\pi}{3}$

(E) $\frac{5\pi}{3}$

(A)

13)

$\cos^{-1}\left(\cos\left(\frac{-\pi}{3}\right)\right) = \frac{\pi}{3}$ 0



The horizontal asymptote(s) of $f(x) = \frac{e^x}{4e^x + e^{-x}}$ is (are)

(A) $x = \frac{1}{4}$ and $x = 0$

(B) $y = 0$

(C) $y = \frac{1}{4}$

(D) $y = \frac{1}{4}$ and $y = 1$

(E) $y = \frac{1}{4}$ and $y = 0$

❖ $y = L$ is H.A if $\lim\limits_{x \to \pm\infty} f(x) = L$,where L is a constant

$$\lim_{x \to \infty} \frac{e^x}{4e^x + e^{-x}} = \frac{1}{4}$$

$$\lim_{x \to -\infty} \frac{e^x}{4e^x + e^{-x}} = 0$$

$y = 14, y = 0$ are horizontal asymptotes of $f(x)$

The equation $2^x + 3\sin(x) = 47$ has a real root in the interval

(A) $(0, 5)$

(B) $(-2, 1)$

(C) $(-3, 4)$

(D) $(3, 6)$

(E) $(-1, 2)$

- The function has a root if $f(a) < 0 < f(b)$ on (a, b) interval

$2^x + 3\sin x = 47$

$f(x) = 2^x + 3\sin x - 47$

by trial & error

$f(3) = 8 + (+1) - 47 = -38 < 0$

$\quad = 8 + (-1) - 47 = -40 < 0$

$f(6) = 64 + (+1) - 47 = 18 > 0$

$\quad = 64 + (-1) - 47 = 16 > 0$

D

$f(x) = \frac{x^2-25}{x^2-6x+5}$ has removable discontinuity(s) at

(A) $x = -5$

(B) $x = 1$

(C) $x = 1$ and $x = 5$

(D) $x = 5$

(E) $x = -1$ and $x = -5$

(A)

$$f(x) = \frac{x^2 - 25}{x^2 - 6x + 5}$$

$$f(x) = \frac{(x-5)(x+5)}{(x-5)(x-1)}$$

$$f(x) = \frac{(x+5)}{(x-1)}$$

removable discontinuity at $x = 5$

D

If $f(x) = \log_4(x)$, then $\lim\limits_{x \to 1} \dfrac{f(x) - f(1)}{x - 1} =$

(A) 0

(B) $\ln(4)$

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

(D) 4

(E) 1

$$\lim_{x \to 1} \frac{f(x) - f(1)}{x - 1} = f'(1)$$

❖ $f'(\log_a x) = \frac{1}{x \cdot \ln a}$

$$f(x) = \log_4 x$$

$$f'(x) = \frac{1}{x \cdot \ln 4}$$

$$f'(1) = \frac{1}{\ln 4}$$

$\mathbb{C}$

$$\lim_{x \to -1^-} \frac{x^4 + 1}{x^2 - 6x - 7} =$$

(A) $-\infty$

(B) ∞

(C) 0

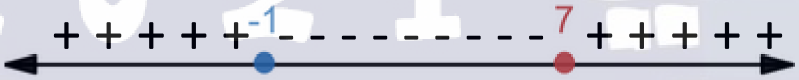
(D) 1

(E) -1

$$\lim_{x \to -1^-} \frac{x^4 + 1}{x^2 - 6x - 7}$$

numerator range is $(+ve)$

$x^2 - 6x - 7$



$\rightarrow -1^- \; is \; (+ve)$

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

$$\lim_{x\to\infty} \ln(5x-9) - \ln(8x+7) =$$

(A) $-\ln(\frac{5}{8})$

(B) $-\infty$

(C) $\ln(\frac{5}{8})$

(D) ∞

(E) $\ln(5)$

6] $\lim_{x\to\infty} \ln(5x-9) - \ln(8x+7)$

$= \lim_{x\to\infty} \ln \frac{5x-9}{8x+7}$

$= \ln \lim_{x\to\infty} \frac{5x-9}{8x+7} = \ln(\frac{5}{8})$ [C]

$$\lim_{x\to 0} x \sin\left(\frac{7}{x}\right) =$$

(A) 7

(B) 0

(C) does not exist

(D) 1

(E) -7

7) $-1 \le \sin\frac{7}{x} \le 1$

$-x \le x\sin\frac{7}{x} \le x$

$\lim_{x\to 0} -x = 0$, $\lim_{x\to 0} x = 0$

so $\lim_{x\to 0} x\sin\frac{7}{x} = 0$ [B]

The equation $x^5 + 2\cos(x) = 77$ has a real root in the interval

(A) $(-2, 2)$

(B) $(-2, 1)$

(C) $(2, 3)$

(D) $(0, 2)$

(E) $(-1, 2)$

8] $f(x) = x^5 + 2\cos(x) - 77$

$f(2) = 2^5 + 2\cos(2) - 77$, $\cos(2) \cong 1$

$f(2) = 32 + 2 - 77 =$ Negative

$f(3) = 3^5 + 2\cos(3) - 77$, $\cos(3) \cong 1$

$f(3) = 243 + 2 - 77 =$ posative

one root in $(2, 3)$ [C]

The equation $3^x + \cos(x) = 30$ has a real root in the interval

(A) $(1, 4)$

(B) $(-2, 1)$

(C) $(0, 1)$

(D) $(0, 2)$

(E) $(-1, 1)$

9] $f(x) = 3^x + \cos(x) - 30$

$f(1) = 3 + \cos(1) - 30$

$f(1) =$ Negative

$f(4) = 3^4 + \cos(4) - 30$

$f(4) =$ posative

one root in $(1, 4)$

A

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

(A) -1

(B) ∞

(C) 0

(D) 1

(E) $-\infty$

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

(D)

Which of the following statements is (always) correct?

(A) If $\lim_{x \to 2} f(x) = 7$, then $f(2) = 7$

(B) $f(x) = \frac{1}{e^x + e^2}$ is not continuous at $x = 2$

(C) If $f(6) = 9$, then $\lim_{x \to 6} f(x) = 9$

(D) If $\lim_{x \to \infty} f(x) = 2$, then $x = 2$ is a vertical asymptote of f

(E) If f is differentiable at $x = 5$, then f is defined at $x = 5$

11) E

If $f(x) = 5^x$, then $\lim_{x \to 0} \frac{f(x) - f(0)}{x - 0} =$

(A) 1

(B) $\frac{1}{\ln(5)}$

12) $\lim_{x \to 0} \frac{f(x) - f(0)}{x - 0} = f'(0) = \ln(5)$ $\quad f(x) = 5^x \rightarrow f'(x) = 5^x \ln(5)$

Which of the following statements is (always) correct?

(A) If $\lim_{x\to\infty} f(x) = 7$, then $x = 7$ is a vertical asymptote of f

(B) $f(x) = \tan(x)$ is continuous on $(-\infty, \infty)$

(C) If $f(x)$ has a corner at $x = 7$, then $f(x)$ is differentiable at $x = 7$

(D) $f(x) = \ln(x)$ is continuous on its domain

(E) A function $f(x)$ can have three horizontal asymptotes

13) D

The vertical asymptote(s) of $f(x) = \frac{x-5}{x^2-9x+20}$ is (are)

(A) $x = 4$

(B) $x = 5$

(C) $x = 5$ and $x = 4$

(D) $x = -4$

(E) $x = -5$ and $x = -4$

14) $x = 4/5$ أصفار المقام

* $\lim_{x \to 4} \frac{x-5}{(x-5)(x-4)} = \frac{1}{0} = \infty$

a) $x = 4$ is V.A

* $\lim_{x \to 5} \frac{x-5}{(x-5)(x-4)} = 1 \neq \pm\infty$

$x = 5$ is not VA

(A)