

# Quiz #1 Study Guide

1 of 2

$$1) \lim_{x \rightarrow 0} \frac{(x+5)^2 - 25}{x} = \lim_{x \rightarrow 0} \frac{x^2 + 10x + 25 - 25}{x} = \lim_{x \rightarrow 0} (x + 10) = 0 + 10 = 10 \leftarrow$$

$$2) \begin{array}{c|ccc|c} 4 & 1 & 0 & 0 & -64 \\ & 4 & 16 & 64 & \\ \hline & 1 & 4 & 16 & 0 \end{array} \quad \lim_{x \rightarrow 4} \frac{x^3 - 64}{x - 4} = \lim_{x \rightarrow 4} (x^2 + 4x + 16) = 4^2 + 4(4) + 16 = 48 \leftarrow$$

$$3) \lim_{x \rightarrow 3^-} f(x) = 7 \leftarrow \quad \lim_{x \rightarrow 3^+} f(x) = 7 \leftarrow \quad \lim_{x \rightarrow 3} f(x) = 7 \leftarrow$$

$$(b) \lim_{x \rightarrow 7^-} f(x) = 9 \leftarrow \quad \lim_{x \rightarrow 7^+} f(x) = 3 \leftarrow \quad \lim_{x \rightarrow 7} f(x) \text{ D.N.E. } \leftarrow$$

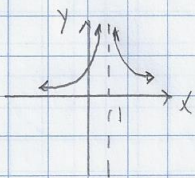
4)

$$(a) \lim_{x \rightarrow 0} \cos\left(\frac{2\pi}{x^2}\right) \text{ D.N.E. } \leftarrow \text{ because it oscillates faster and faster between } -1 \text{ and } 1 \text{ as } x \rightarrow 0$$

$$(b) \lim_{x \rightarrow 0} x^2 \cos\left(\frac{2\pi}{x^2}\right) = 0 \cdot \left[ \begin{array}{c} \text{bounded} \\ \text{between} \\ -1 \text{ \& } 1 \end{array} \right] = 0 \leftarrow$$

5)

(a)



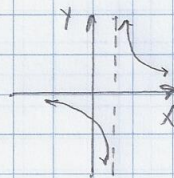
$$\lim_{x \rightarrow 1^-} f(x) = \infty \leftarrow$$

$$x \rightarrow 1^-$$

$$\lim_{x \rightarrow 1^+} f(x) = -\infty \leftarrow$$

$$\lim_{x \rightarrow 1} f(x) = \text{D.N.E.} \leftarrow$$

(b)



$$\lim_{x \rightarrow 1^-} f(x) = -\infty \leftarrow$$

$$\lim_{x \rightarrow 1^+} f(x) = \infty \leftarrow$$

$$\lim_{x \rightarrow 1} f(x) \text{ D.N.E. } \leftarrow$$

6)

$$\lim_{x \rightarrow \pm\infty} \frac{3x^5 + 7x^4}{6x^6 + 3x^5} \xrightarrow{\text{Dominates}} \lim_{x \rightarrow \pm\infty} \frac{3x^5}{6x^6} = \lim_{x \rightarrow \pm\infty} \frac{1}{2x} = 0 \Rightarrow y=0 \text{ is H.A. } \leftarrow$$

7)

$$\lim_{x \rightarrow \pm\infty} \frac{3x^5 + 7x^4}{6x^5 + 3x^4} = \lim_{x \rightarrow \pm\infty} \frac{3x^5}{6x^5} = \frac{1}{2} \Rightarrow y = \frac{1}{2} \text{ is H.A. } \leftarrow$$

8)

$$a = 2(-21) = -42 = -2 \cdot 3 \cdot 7 = tu, \quad b = -1 = t+u, \quad t = -7, \quad u = 6$$

$$2x^2 - x - 21 = 2x^2 - 7x + 6x - 21 = x(2x - 7) + 3(2x - 7) = (x+3)(2x-7)$$

$$f(x) = \frac{x-7}{(x+3)(2x-7)} \Rightarrow x = -3 \text{ \& } x = 3.5 \text{ are V.A.s } \leftarrow$$

# Quiz #1 Study Guide

20F2

9)

$$\begin{array}{r} 3x - 17 \\ x^2 + 3x - 4 \overline{) 3x^3 - 8x^2 + 2x - 9} \\ \underline{-3x^3 - 9x^2 + 12x} \phantom{-9} \\ -17x^2 + 14x - 9 \\ \underline{17x^2 + 51x - 68} \\ 65x - 77 \end{array}$$

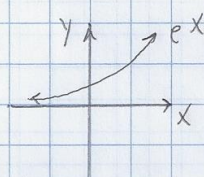
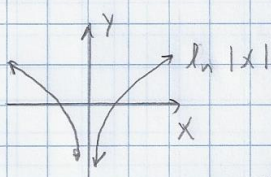
$$f(x) = 3x - 17 + \frac{65x - 77}{x^2 + 3x - 4} \Rightarrow$$

$$E(x) = 3x - 17 \leftarrow$$

10)

$$\lim_{x \rightarrow \infty} \frac{x^5 + \log x}{x^7 + \ln x} \xrightarrow{\text{Dominated}} = \lim_{x \rightarrow \infty} \frac{x^5}{x^7} = \lim_{x \rightarrow \infty} \frac{1}{x^2} = 0 \leftarrow$$

11)



Dominated

$$(a) \lim_{x \rightarrow -\infty} (\ln|x| - e^x) = \infty - 0 = \infty \leftarrow$$

$$(b) E_L(x) = \ln|x| \leftarrow$$

Dominated

$$(c) \lim_{x \rightarrow \infty} (\ln|x| - e^x) = \infty - \infty = -\infty \leftarrow$$

$$(d) E_R(x) = -e^x \leftarrow$$