

Homework

* Watch the Squeeze Theorem video on my website and take notes (EVERYONE)

VETERANS: Epsilon-Delta Practice

ROOKIES: Find each limit. Calculators may not be used.

$$1. \lim_{x \rightarrow -3} (2x + 5) = -1$$

$$2. \lim_{x \rightarrow 5} \left(\frac{x-3}{x+5} \right) = \frac{2}{10} = \frac{1}{5}$$

$$3. \lim_{x \rightarrow 7} |x - 12| = 5$$

$$4. \lim_{x \rightarrow 2} (\sqrt{x-5}) \Rightarrow DNE$$

\downarrow
 "not"
 $=$

$$5. \lim_{x \rightarrow -4} (x+2)^2 = 4$$

$$6. \lim_{x \rightarrow 0} (x^2 - 5x + 3) = 3$$

Use the following functions for #'s 7 - 13:

$$f(x) = x^2 - 7$$

$$g(x) = x - 5$$

$$h(x) = x^2 - 25$$

$$7. \lim_{x \rightarrow 4} f(x) = 9$$

$$8. \lim_{x \rightarrow -3} h(x) = -16$$

$$9. \lim_{x \rightarrow 2} g(x) = -3$$

$$10. \lim_{x \rightarrow -1} f(x) + h(x)$$

$$= \lim_{x \rightarrow -1} f(x) + \lim_{x \rightarrow -1} h(x)$$

$$= -6 + (-24) = -30$$

$$11. 3 \lim_{x \rightarrow 3} g(x)$$

$$= 3 \cdot 3 = 9$$

$$12. \lim_{x \rightarrow 4} f(x) - h(x) + g(x)$$

$$= \lim_{x \rightarrow 4} f(x) - \lim_{x \rightarrow 4} h(x) + \lim_{x \rightarrow 4} g(x)$$

~~$$= \lim_{x \rightarrow 4} f(x) - \lim_{x \rightarrow 4} h(x) + \lim_{x \rightarrow 4} g(x)$$~~

$$= 9 - 9 + (-1) = -1$$

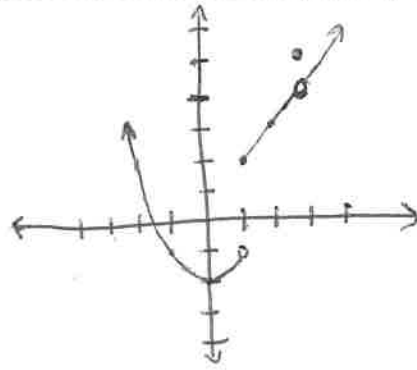
$$13. \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$\lim_{h \rightarrow 0} \frac{[(a+h)^2 - 7] - [a^2 - 7]}{h}$$

$$\lim_{h \rightarrow 0} \frac{[a^2 + 2ah + h^2 - 7 - a^2 + 7]}{h}$$

$$\lim_{h \rightarrow 0} \frac{2ah + h^2}{h} = \lim_{h \rightarrow 0} 2a + h = 2a$$

$$14. f(x) = \begin{cases} x^2 - 2 & x < 1 \\ x + 1 & x \geq 1; x \neq 3 \\ \sqrt{x + 22} & x = 3 \end{cases}$$



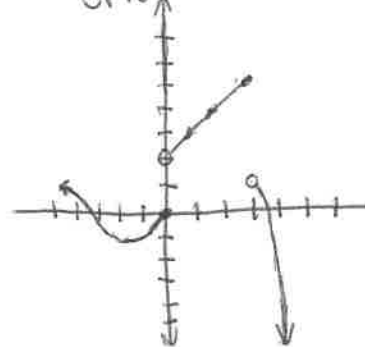
a) sketch a graph of f(x)

b) $f(1) = 2$ c) $f(2) = 3$ d) $f(3) = 5$ e) $f(-1) = -1$

f) $\lim_{x \rightarrow 1^-} f(x) = -1$ g) $\lim_{x \rightarrow 1^+} f(x) = 2$ h) $\lim_{x \rightarrow 1} f(x) \Rightarrow \text{DNE}$ i) $\lim_{x \rightarrow 2^-} f(x) = 3$
 ↳ from middle branch of f(x)

j) $\lim_{x \rightarrow 3^-} f(x) = 4$ k) $\lim_{x \rightarrow 3^+} f(x) = 4$ l) $\lim_{x \rightarrow 2} f(x) = 2$ m) $\lim_{x \rightarrow 0^-} f(x) = -2$
 ↳ from top branch of f(x) ↳ from top branch of f(x)

$$15. f(x) = \begin{cases} \sin x & x \leq 0 \\ |x| + 2 & 0 < x \leq 3 \\ -x^2 + 10 & x > 3 \end{cases}$$



a) sketch a graph of f(x)

b) $f(0) = 0$ c) $f(3) = 5$ d) $f(2) = 4$ e) $f(7) = -39$

f) $\lim_{x \rightarrow 0^+} f(x) = 2$ g) $\lim_{x \rightarrow 0^-} f(x) = 0$ h) $\lim_{x \rightarrow 3^+} f(x) = 1$ i) $\lim_{x \rightarrow 3^-} f(x) = 5$
 ↳ leave exact

j) $\lim_{x \rightarrow 5^-} f(x) = -15$ k) $\lim_{x \rightarrow 1^+} f(x) = 3$ l) $\lim_{x \rightarrow -45} f(x) = \sin(-45)$
 ↳ from bottom branch of f(x) ↳ from middle branch of f(x) ↳ from top branch of f(x)