

Limits Homework

Date _____

Evaluate each limit.

$$1) \lim_{x \rightarrow -3} \frac{x+3}{x^2+8x+15} = \frac{\cancel{x+3}}{(x+5)(x+3)} = \frac{-1}{2}$$

$$2) \lim_{x \rightarrow 4} \frac{x-4}{x^2-5x+4} = \frac{\cancel{x-4}}{(x-4)(x-1)} = \frac{1}{3}$$

$$3) \lim_{x \rightarrow \infty} \frac{3x}{x-2} = 3$$

$$4) \lim_{x \rightarrow \infty} \frac{16x}{x^2+16} = 0$$

$$5) \lim_{x \rightarrow \infty} \frac{2x}{x+3} = 2$$

$$6) \lim_{x \rightarrow -\infty} \frac{2x^2}{3x+2} = \infty$$

$$7) \lim_{x \rightarrow -1} f(x), f(x) = \begin{cases} -2, & x \leq -1 \\ -2x-4, & x > -1 \end{cases} = 2$$

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$$8) \lim_{x \rightarrow -2^+} f(x), f(x) = \begin{cases} x+5, & x < -2 \\ 2, & x \geq -2 \end{cases} = 2$$

$$9) \lim_{x \rightarrow -1} f(x), f(x) = \begin{cases} 2x-3, & x \leq -1 \\ -2x+5, & x > -1 \end{cases}$$

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$$10) \lim_{x \rightarrow 4} f(x), f(x) = \begin{cases} -2x+5, & x < 4 \\ -x^2+4x-3, & x \geq 4 \end{cases} = -3$$

$$11) \lim_{x \rightarrow -4} f(x), f(x) = \begin{cases} -x^2-12x-37, & x < -4 \\ -5, & x \geq -4 \end{cases}$$

=-5

$$12) \lim_{x \rightarrow 1} \frac{\sqrt{x}-1}{x-1} \left(\frac{\sqrt{x}+1}{\sqrt{x}+1} \right) = \frac{1}{2}$$

$$13) \lim_{x \rightarrow 9} \frac{x-9}{\sqrt{x}-3}$$

6

$$14) \lim_{x \rightarrow 0} \frac{\frac{1}{1+x} - 1}{x}$$

-1

$$15) \lim_{x \rightarrow 0} \frac{\frac{1}{-3+x} + \frac{1}{3}}{x}$$

$-\frac{1}{9}$

$$16) \lim_{x \rightarrow 1} \frac{3x^2 - 4x + 1}{x^2 - 1}$$

1

$$17) \lim_{x \rightarrow -5} \left(-\frac{x^2}{2} - x + \frac{7}{2} \right)$$

-4

$$18) \lim_{x \rightarrow -1} \frac{x-7}{x^2-2x}$$

$-\frac{8}{3}$

$$19) \lim_{x \rightarrow 4} \frac{x+7}{x^2-16x+63}$$

$\frac{11}{15}$

$$20) \lim_{x \rightarrow 4} \frac{\sqrt{x}-2}{x-4}$$

$\frac{1}{4}$

$$21) \lim_{x \rightarrow 2} \frac{x-2}{x^2-x-2}$$

$\frac{1}{3}$

$$22) \lim_{x \rightarrow 3} \frac{x-3}{x^2-7x+12}$$

1

$$23) \lim_{x \rightarrow 9} \frac{\sqrt{x}-3}{x-9}$$

$\frac{1}{6}$

$$24) \lim_{x \rightarrow -3} \frac{(x+3)(x-2)}{x+3}$$

-5