

Limits and Continuity Problem Set

Date _____

Evaluate each limit.

1) $\lim_{x \rightarrow 2} -\sqrt{x+5}$

2) $\lim_{x \rightarrow -2} (x^2 + 2x - 1)$

3) $\lim_{x \rightarrow \frac{3\pi}{4}} -\sin(x)$

4) $\lim_{x \rightarrow 0} (2x + 5)$

5) $\lim_{x \rightarrow 0^-} f(x), f(x) = \begin{cases} -2x - 1, & x < 0 \\ 2x - 1, & x \geq 0 \end{cases}$

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

7) $\lim_{x \rightarrow 1} (x + |x - 1|)$

8) $\lim_{x \rightarrow 2} f(x), f(x) = \begin{cases} \frac{x}{2}, & x \leq 2 \\ x^2 - 2x + 1, & x > 2 \end{cases}$

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

10) $\lim_{x \rightarrow 2} -\frac{x^2+x-6}{x-2}$

11) $\lim_{x \rightarrow 0} \frac{\cos\left(\frac{\pi}{2} - x\right)}{x}$

12) $\lim_{x \rightarrow 0} \frac{1 - \sin\left(\frac{\pi}{2} + x\right)}{x}$

$$13) \lim_{x \rightarrow 3^+} \frac{x+1}{x^2 - 6x + 9}$$

$$14) \lim_{x \rightarrow -1} -\frac{3}{x+1}$$

$$15) \lim_{x \rightarrow -1} \frac{x+1}{x^2 - x - 2}$$

$$16) \lim_{x \rightarrow -\frac{\pi}{2}^-} -\sec(x)$$

$$17) \lim_{x \rightarrow \infty} \frac{x}{\cos \frac{1}{x}}$$

$$18) \lim_{x \rightarrow \infty} -\frac{2x^2}{3x+2}$$

$$19) \lim_{x \rightarrow \infty} -2x \cos x$$

$$20) \lim_{x \rightarrow -\infty} (-x^4 + 4x^2 + 3x - 4)$$

Determine if each function is continuous. If the function is not continuous, find the x -axis location of and classify each discontinuity.

$$21) f(x) = \begin{cases} \frac{x}{2}, & x \neq 3 \\ -1, & x = 3 \end{cases}$$

$$22) f(x) = \begin{cases} -x^2 - 6x - 10, & x < -2 \\ \frac{x}{2} + \frac{1}{2}, & x \geq -2 \end{cases}$$

$$23) f(x) = -\frac{x}{x^2 + x}$$

$$24) f(x) = \frac{x}{x^2 + 2x + 1}$$

$$25) f(x) = \begin{cases} -x^2 - 8x - 16, & x \neq -3 \\ -2, & x = -3 \end{cases}$$