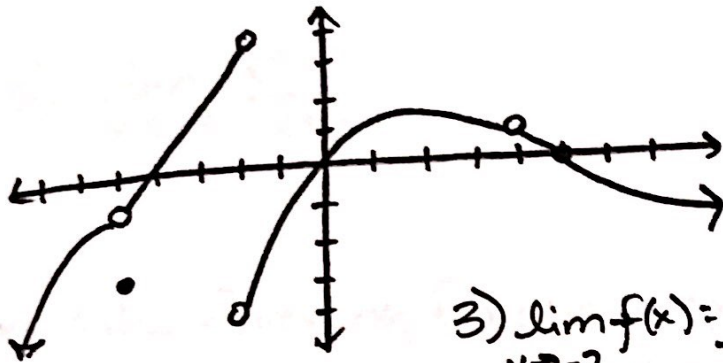


Use the graph to find the limit or value.



1)  $\lim_{x \rightarrow -2^+} f(x) = \underline{\hspace{2cm}}$

2)  $\lim_{x \rightarrow -2^-} f(x) = \underline{\hspace{2cm}}$

3)  $\lim_{x \rightarrow -2} f(x) = \underline{\hspace{2cm}}$

4)  $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$

5)  $\lim_{x \rightarrow 3^-} f(x) = \underline{\hspace{2cm}}$

6)  $\lim_{x \rightarrow 4^-} f(x) = \underline{\hspace{2cm}}$

7)  $\lim_{x \rightarrow 4^+} f(x) = \underline{\hspace{2cm}}$

8)  $f(-5) = \underline{\hspace{2cm}}$

9)  $f(-2) = \underline{\hspace{2cm}}$

10)  $f(5) = \underline{\hspace{2cm}}$

Use the piecewise function to find your answers.

$$f(x) = \begin{cases} x^2 - 6x - 2 & \text{if } x \leq -1 \\ \frac{x^2 + 4}{x + 2} & \text{if } -1 < x \leq 3 \\ -2x + 5 & \text{if } x > 3 \end{cases}$$

11)  $\lim_{x \rightarrow -1} f(x) = \underline{\hspace{2cm}}$

12)  $\lim_{x \rightarrow -1^-} f(x) = \underline{\hspace{2cm}}$

13)  $\lim_{x \rightarrow -1^+} f(x) = \underline{\hspace{2cm}}$

14)  $\lim_{x \rightarrow 3} f(x) = \underline{\hspace{2cm}}$

15)  $f(4) = \underline{\hspace{2cm}}$

16)  $f(3) = \underline{\hspace{2cm}}$

17)  $f(-1) = \underline{\hspace{2cm}}$

Given  $f(x) = x^2 + 2$  and  $g(x) = 2x - 3$ , find the limits.

18)  $\lim_{x \rightarrow -1} f(x) + g(x) = \underline{\hspace{2cm}}$

19)  $\lim_{x \rightarrow 1} g(f(x)) = \underline{\hspace{2cm}}$

20)  $\frac{\lim_{x \rightarrow 2} f(g(x))}{\lim_{x \rightarrow 1} f(x)} = \underline{\hspace{2cm}}$

Evaluate the limit.

$$21) \lim_{x \rightarrow 4} \frac{x^2 - 2x - 8}{x - 4}$$

$$22) \lim_{x \rightarrow 3} \frac{5x - 9}{x^2 - 5}$$

$$23) \lim_{x \rightarrow -3} \frac{x^3 + 27}{x + 3}$$

$$24) \lim_{x \rightarrow 5^-} \frac{x - 6}{x - 5}$$

Are the following functions continuous? If not, state the discontinuities and the interval(s) of continuity.

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

$$26) f(x) = \frac{x^2 - 16}{x + 4}$$

27) Is the piecewise function continuous at  $x = 0$  and  $x = 3$ ?

$$f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ 2x & \text{if } 0 \leq x < 3 \\ (x-3)^2 & \text{if } x \geq 3 \end{cases}$$

Find the value of  $a$  that will make  $f(x)$  continuous.

$$28) f(x) = \begin{cases} ax + 3 & \text{if } x < 2 \\ 4 + \sqrt{x+7} & \text{if } x \geq 2 \end{cases}$$

$$29) f(x) = \begin{cases} ax^2 - 1 & \text{if } x \leq -6 \\ -5x - 8 & \text{if } x > -6 \end{cases}$$