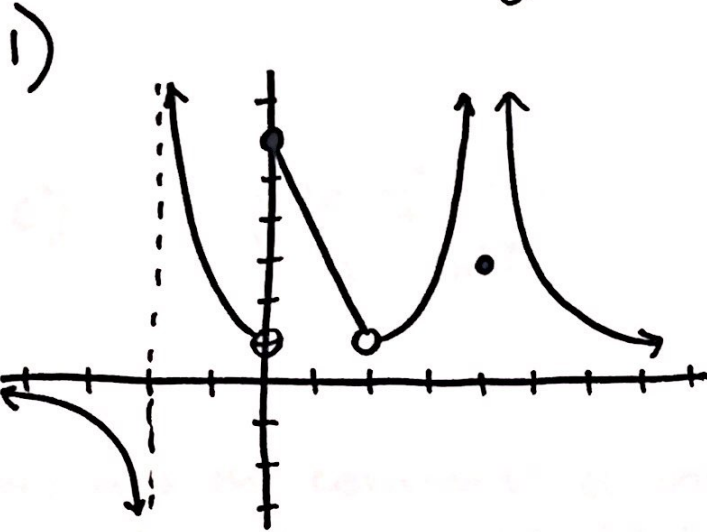


AP Calculus AB
 Continuity and
 One-Sided Limits
 HW 1-5

Name: _____

Use the graph to find the limits & values.



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

b) $f(2) = \underline{\hspace{2cm}}$ g) $\lim_{x \rightarrow 0^+} f(x) = \underline{\hspace{2cm}}$

c) $f(-2) = \underline{\hspace{2cm}}$ h) $\lim_{x \rightarrow 0^-} f(x) = \underline{\hspace{2cm}}$

d) $\lim_{x \rightarrow 2^+} f(x) = \underline{\hspace{2cm}}$ i) $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$

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

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

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

2) Use algebra to find the limit if it exists. If necessary, graph the function.

a) $\lim_{x \rightarrow 5^+} \frac{x-5}{x^2-25}$

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

c) $\lim_{x \rightarrow 0^-} \frac{|x|}{x}$

d) $\lim_{x \rightarrow 2^+} \frac{|x-2|}{x-2}$

e) $\lim_{x \rightarrow 3^-} f(x)$, where

$$f(x) = \begin{cases} \frac{x+2}{2}, & x \leq 3 \\ \frac{12-2x}{3}, & x > 3 \end{cases}$$

f) $\lim_{x \rightarrow 2} f(x)$, where

$$f(x) = \begin{cases} x^2-4x+6, & x < 2 \\ -x^2+4x-2, & x \geq 2 \end{cases}$$

Discuss the continuity of the functions.

$$a) f(x) = \begin{cases} x^2, & x < 1 \\ 2, & x = 1 \\ 4 - x^2, & x > 1 \end{cases}$$

$$b) f(x) = \begin{cases} -2x, & x \leq 2 \\ x^2 - 4x + 1, & x > 2 \end{cases}$$

$$c) f(x) = \begin{cases} \tan \frac{\pi x}{4}, & |x| < 1 \\ x, & |x| \geq 1 \end{cases}$$

$$d) f(x) = \begin{cases} \csc \frac{\pi x}{6}, & |x| \leq 2 \\ 2, & |x| > 2 \end{cases}$$

4) Find the constants a and b such that the function is continuous on the entire number line.

$$a) f(x) = \begin{cases} 2, & x \leq -1 \\ ax + b, & -1 < x < 3 \\ -2, & x \geq 3 \end{cases}$$

$$b) f(x) = \begin{cases} \frac{3 - 3\cos x}{x}, & x < 0 \\ a - 2x, & x \geq 0 \end{cases}$$

5) Explain why the function has a zero in the specified interval.

$$a) f(x) = x^3 + 3x - 2, [0, 1]$$

$$b) f(x) = -\frac{4}{x} + \tan\left(\frac{\pi x}{8}\right), [1, 3]$$