

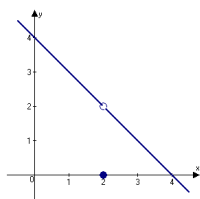
Review Chapter 1

1. Let

$$f(x) = \begin{cases} 4-x, & x \neq 2 \\ 0 & x = 2 \end{cases}$$

Determine the following limit. (Hint: Use the graph of the function.)

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



2. Find the limit:

a. $\lim_{x \rightarrow 1} (3x^3 - 2x^2 + 4)$

b. $\lim_{x \rightarrow 1} \frac{x-3}{x^2+4}$

c. $\lim_{x \rightarrow 3} \frac{\sqrt{x+1}}{x-4}$

d. $\lim_{x \rightarrow \pi} \tan x$

e. $\lim_{x \rightarrow 0} (2x-1)^3$

f. $\lim_{x \rightarrow -3} \frac{x^2+x-6}{x^2-9}$

g. $\lim_{x \rightarrow 4} \frac{\sqrt{x+5}-3}{x-4}$

h. $\lim_{\Delta x \rightarrow 0} \frac{(x+\Delta x)^2 - x^2}{\Delta x}$

i. $\lim_{\Delta x \rightarrow 0} \frac{2(x+\Delta x) - 2x}{\Delta x}$

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3. Find x-values (if any) for which f is not continuous. Which of the discontinuities are removable?

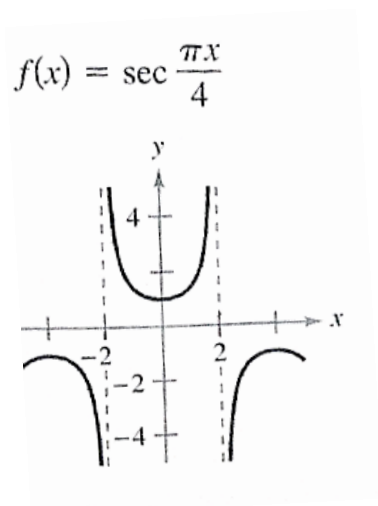
a. $f(x) = \frac{x+2}{x^2-3x-10}$

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

4. Determine all values for c that the function f is continuous on $(-\infty, \infty)$.

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

5. Find the interval(s) for which the function f shown in the graph is continuous.



6. Use the Intermediate Value Theorem to show that the function $f(x) = x^3 + 3x - 2$ has a zero in the interval $[0, 1]$.

7. Let $f(x) = \begin{cases} x^2 - 4x + 6, & x < 2 \\ -x^2 + 4x - 2, & x \geq 2 \end{cases}$. Find each limit (if it exists).

a. $\lim_{x \rightarrow 2^-} f(x)$

b. $\lim_{x \rightarrow 2^+} f(x)$

c. $\lim_{x \rightarrow 2} f(x)$

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8. Find the limit: $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$

9. Find all vertical asymptotes.

a. $f(x) = \frac{x^2 + 2x - 8}{x^2 - 4}$

b. $f(x) = \frac{2 + x}{x^2(1 - x)}$

10. Find the limit.

a. $\lim_{x \rightarrow 2^+} \frac{x - 3}{x - 2}$

b. $\lim_{x \rightarrow 3^-} \frac{x^2 + 2x - 3}{x^2 + x - 6}$

KNOW YOUR UNIT CIRCLE!!