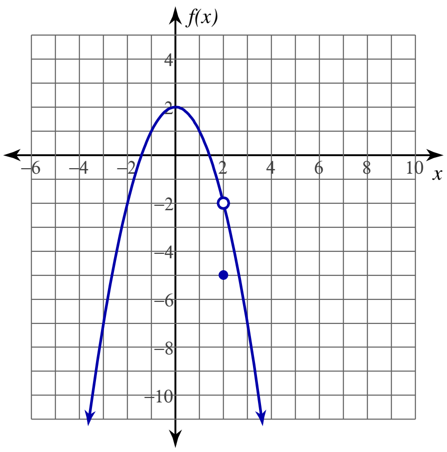
Name________________________________

Evaluating Limits

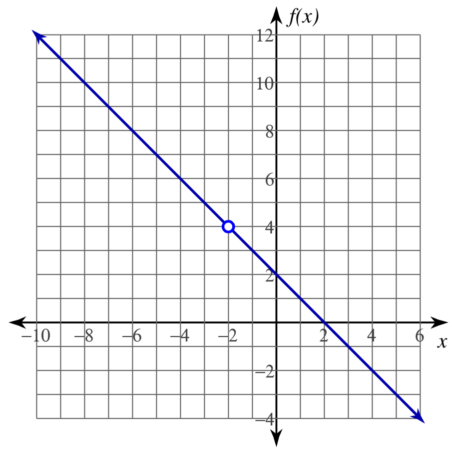
Date________________ Period____

Evaluate each limit.

1) $\lim_{x \to 2} f(x),\ f(x) = \begin{cases} -x^2 + 2, & x \neq 2 \\ -5, & x = 2 \end{cases}$

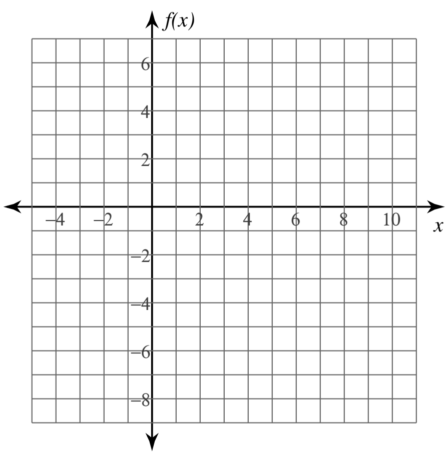


2) $\lim_{x \to -2} -\frac{x^2 - 4}{x + 2}$

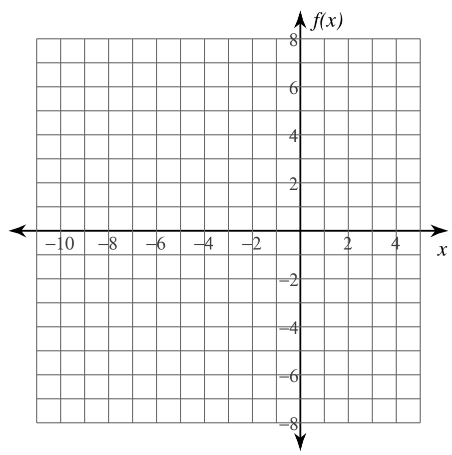


Evaluate each limit. You may use the provided graph to sketch the function.

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



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



Evaluate each limit.

5) $\lim_{x \to 0} f(x),\ f(x) = \begin{cases} x + 1, & x \neq 0 \\ 2, & x = 0 \end{cases}$

6) $\lim_{x \to 3} f(x),\ f(x) = \begin{cases} 2 + \frac{x}{2}, & x \neq 3 \\ 2, & x = 3 \end{cases}$

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

8) $\lim_{x \to 5} \frac{x^2 - 5x}{x - 5}$

9) $\lim_{x \to 2} \frac{x^2 - x - 2}{x - 2}$

10) $\lim_{x \to -5} \frac{x^2 + 3x - 10}{x + 5}$

11) $\lim_{x \to 0} \frac{\frac{1}{-4 + x} + \frac{1}{4}}{x}$

12) $\lim_{x \to -3} \frac{x}{\frac{1}{3 + x} - \frac{1}{3}}$

13) $\lim_{x \to 5} \frac{x - 5}{\sqrt{x + 4} - 3}$

14) $\lim_{x \to 3} \frac{\sqrt{x + 6} - 3}{x - 3}$

Critical thinking questions:

15) Give an example of a limit of a rational function where the limit at -1 exists, but the rational function is undefined at -1.

16) Give two values of *a* where the limit cannot be solved using direct evaluation. Give one value of *a* where the limit can be solved using direct evaluation.

$$\lim_{x \to a} \frac{x}{\frac{1}{-2 + x} + \frac{1}{2}}$$

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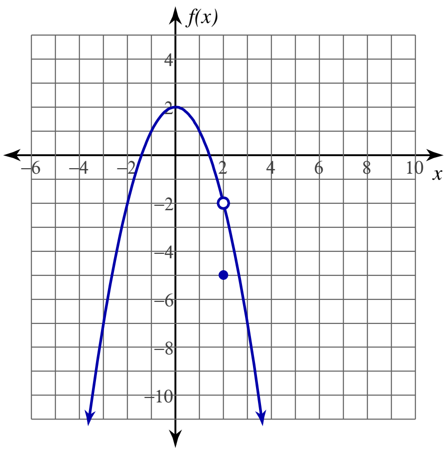
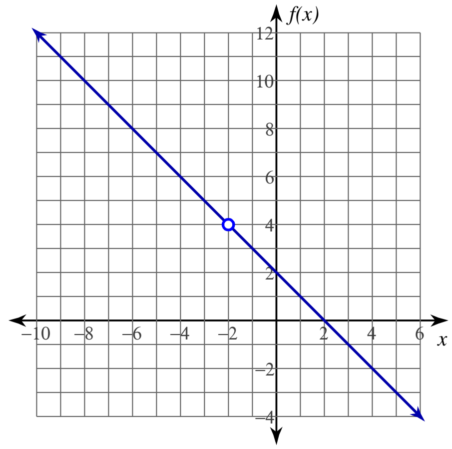


-2

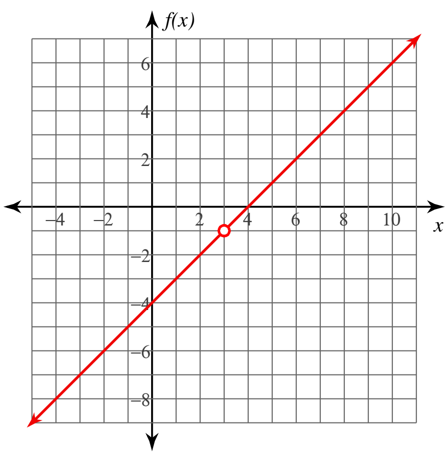
2) $\lim_{x \to -2} -\dfrac{x^2 - 4}{x + 2}$



4

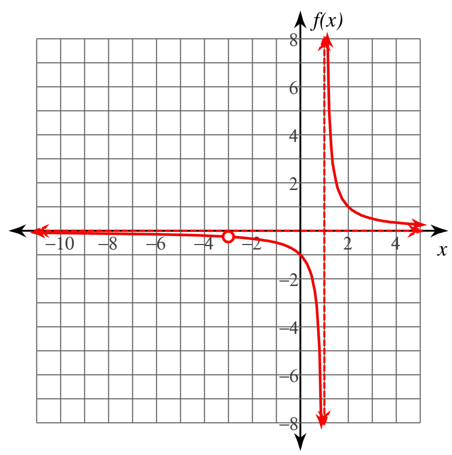
Evaluate each limit. You may use the provided graph to sketch the function.

3) $\lim_{x \to 3} \dfrac{x^2 - 7x + 12}{x - 3}$



-1

4) $\lim_{x \to -3} \dfrac{x + 3}{x^2 + 2x - 3}$



$-\dfrac{1}{4}$

Evaluate each limit.

5) $\lim_{x \to 0} f(x),\ f(x) = \begin{cases} x + 1, & x \neq 0 \\ 2, & x = 0 \end{cases}$

1

6) $\lim_{x \to 3} f(x),\ f(x) = \begin{cases} 2 + \dfrac{x}{2}, & x \neq 3 \\ 2, & x = 3 \end{cases}$

$\dfrac{7}{2}$

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

-2

8) $\lim_{x \to 5} -\frac{x^2 - 5x}{x - 5}$

-5

9) $\lim_{x \to 2} -\frac{x^2 - x - 2}{x - 2}$

-3

10) $\lim_{x \to -5} \frac{x^2 + 3x - 10}{x + 5}$

-7

11) $\lim_{x \to 0} \frac{\frac{1}{-4 + x} + \frac{1}{4}}{x}$

$-\frac{1}{16}$

12) $\lim_{x \to -3} \frac{x}{\frac{1}{3 + x} - \frac{1}{3}}$

0

13) $\lim_{x \to 5} \frac{x - 5}{\sqrt{x + 4} - 3}$

6

14) $\lim_{x \to 3} \frac{\sqrt{x + 6} - 3}{x - 3}$

$\frac{1}{6}$

Critical thinking questions:

15) Give an example of a limit of a rational function where the limit at -1 exists, but the rational function is undefined at -1.

Many answers. Ex: $\lim_{x \to -1} \frac{x^2 - 1}{x + 1}$

16) Give two values of *a* where the limit cannot be solved using direct evaluation. Give one value of *a* where the limit can be solved using direct evaluation.

$\lim_{x \to a} \frac{x}{\frac{1}{-2 + x} + \frac{1}{2}}$

No direct eval: a=0,2 Direct eval: a=any other number