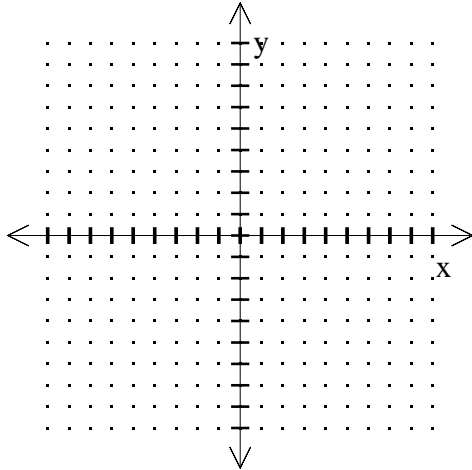


Limits - Review II

***If the limit DNE you must explain why!

1. Let $f(x) = \frac{x^2 - 9}{x - 3}$

a. Graph the function.



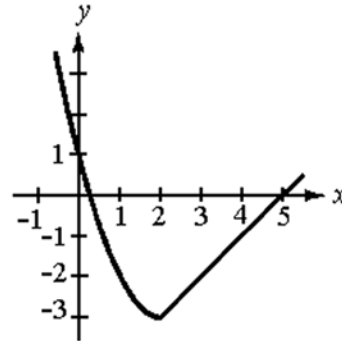
b. Use the graph to estimate $\lim_{x \rightarrow 3} f(x)$.

c. Generate a table that numerically supports your answer to part b.

d. Find the limit by analytical methods.

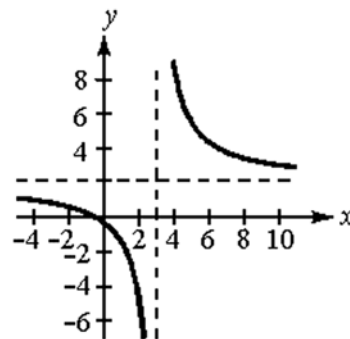
e. Explain your answer in words.

2. Use the graph to estimate $\lim_{x \rightarrow 2} f(x)$.



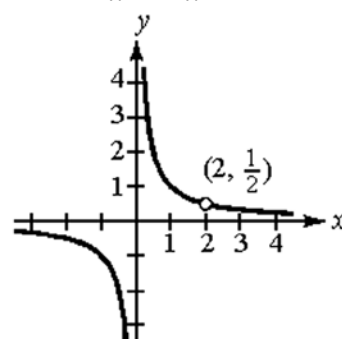
3. Use the graph to find $\lim_{x \rightarrow 3} f(x)$ (if it exists) for

$$f(x) = \frac{2x+1}{x-3}$$

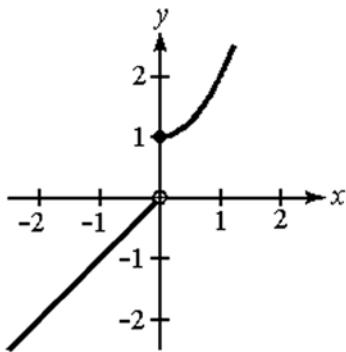


4. Use the graph to find $\lim_{x \rightarrow 2} f(x)$ (if it exists) for

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



5. Use the graph to find $\lim_{x \rightarrow 0} f(x)$.



6. Find the limit: $\lim_{x \rightarrow 3} (2x^2 - 4)$.

7. Find the limit: $\lim_{x \rightarrow -1} \frac{x^2 + 3x + 2}{x^2 + 1}$.

8. Find the limit: $\lim_{x \rightarrow \pi/2} \frac{\sin x}{x}$.

9. Find the limit: $\lim_{x \rightarrow 2} \frac{x-2}{x^2-4}$.

10. Find the limit: $\lim_{x \rightarrow -1} \frac{x^2 - 5x - 6}{x + 1}$.

11. Find the limit: $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$.

12. Find the limit: $\lim_{x \rightarrow 0} \frac{\sqrt{x+9} - 3}{x}$.

13. Find the limit: $\lim_{x \rightarrow 6} \frac{1}{(x-6)^2}$.

14. Find the limit: $\lim_{x \rightarrow 2^-} \frac{1}{x-2}$.

15. Let $f(x) = \begin{cases} x^2 + 1 & x \leq 0 \\ 2x - 3 & x > 0 \end{cases}$

a. $\lim_{x \rightarrow 0^-} f(x)$

b. $\lim_{x \rightarrow 0^+} f(x)$

c. $\lim_{x \rightarrow 0} f(x)$

16. Find the limits:

a) $\lim_{x \rightarrow 1^-} \sqrt{x-1}$

b) $\lim_{x \rightarrow 1^+} \sqrt{x-1}$

c) $\lim_{x \rightarrow 1} \sqrt{x-1}$

17. Find the vertical asymptote(s) of

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

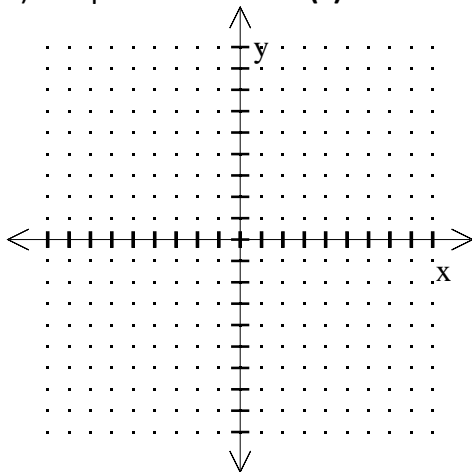
18. Given $f(x) = \frac{x^3 - 2x^2}{x - 2}$

a) Find the value(s) of x for which the function is discontinuous. Label each as removable or non-removable.

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

c) Find a function, $g(x)$ that agrees with $f(x)$ at all but one point.

d) Graph the function $f(x)$



19. Determine the value of c so that $f(x)$ is continuous on the entire real line when

$$f(x) = \begin{cases} x - 2 & x \leq 5 \\ cx - 3 & x > 5 \end{cases}$$

20. Sketch the graph of one function that satisfies all of the stated conditions.

$$\lim_{x \rightarrow -\infty} f(x) = 2 \quad \lim_{x \rightarrow \infty} f(x) = \infty$$

$$\lim_{x \rightarrow -1^-} f(x) = -\infty \quad \lim_{x \rightarrow -1^+} f(x) = -\infty$$

$$\lim_{x \rightarrow 2^-} f(x) = 0 \quad \lim_{x \rightarrow 2^+} f(x) = 2$$

