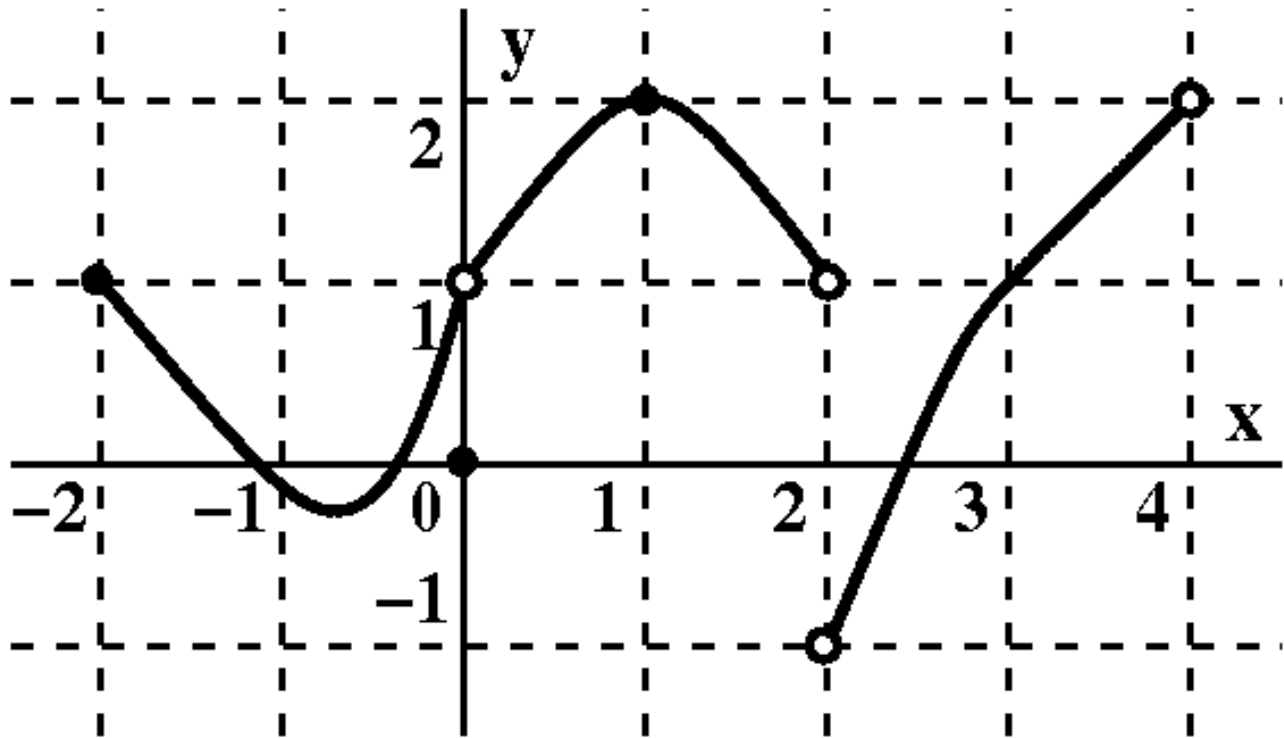


Chapter 1 Practice test Part 1 (should complete all of the problems)

1) Below is a graph of the function $f(x)$.



Find the following.

a) $f(0)$

b) $f(1)$

c) $f(-2)$

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

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

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

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

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

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

$$1a) f(0) = 0$$

$$1b) f(1) = 2$$

$$1c) f(-2) = 1$$

$$1d) \lim_{x \rightarrow 0^-} f(x) = 1$$

$$1e) \lim_{x \rightarrow 0^+} f(x) = 1$$

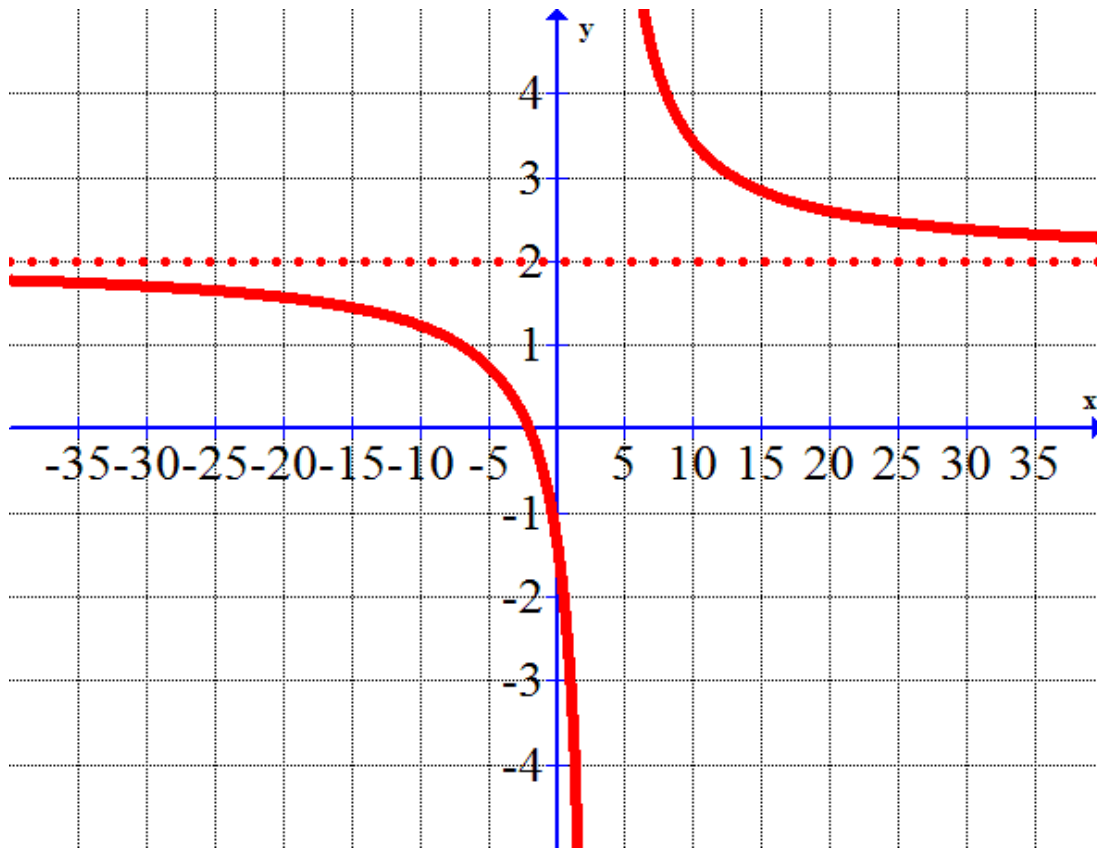
$$1f) \lim_{x \rightarrow 0} f(x) = 1$$

$$1g) \lim_{x \rightarrow 2^-} f(x) = 1$$

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

$$1i) \lim_{x \rightarrow 2} f(x) = dne$$

2)



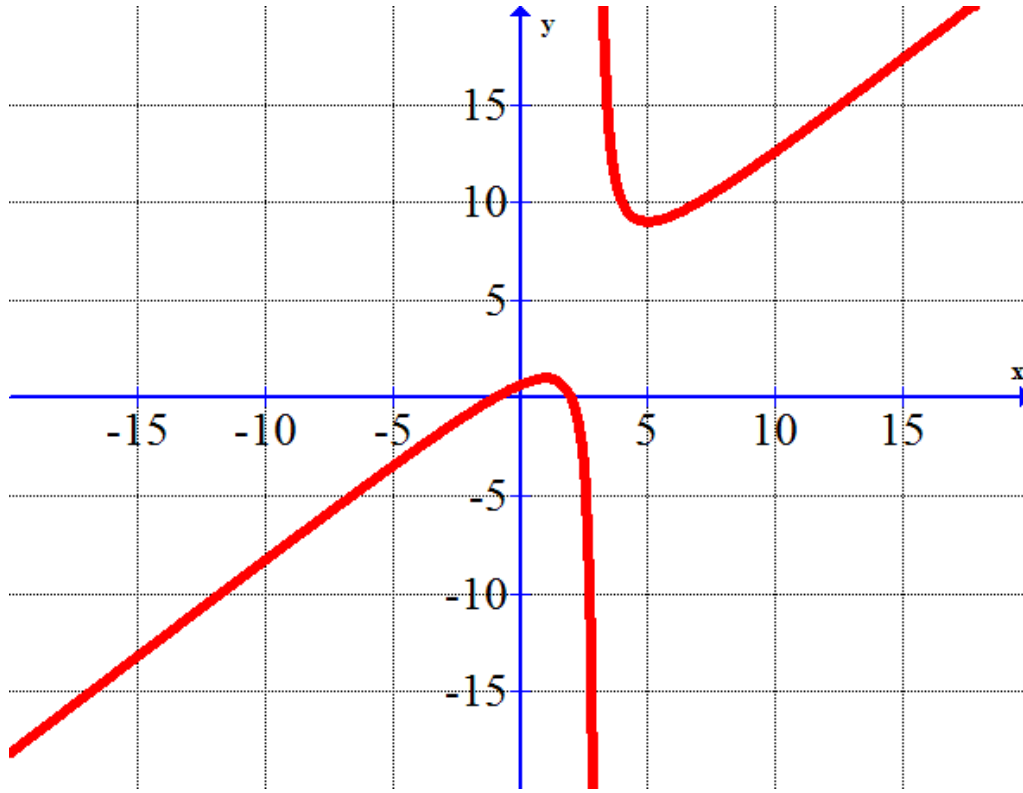
a) $\lim_{x \rightarrow \infty} f(x) =$

b) $\lim_{x \rightarrow -\infty} f(x)$

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

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

3)



a) $\lim_{x \rightarrow \infty} f(x)$

b) $\lim_{x \rightarrow -\infty} f(x)$

3a) $\lim_{x \rightarrow \infty} f(x) = \infty$

3b) $\lim_{x \rightarrow -\infty} f(x) = -\infty$

4) Find the following limits using Algebra.

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

4a) $\lim_{x \rightarrow 2} (x^2 + 4x - 3) = 9$

$$\text{b) } \lim_{x \rightarrow -2} \frac{x^2 + 5x + 6}{x^2 + 8x + 12}$$

$$4\text{b) } \lim_{x \rightarrow -2} \frac{x^2 + 5x + 6}{x^2 + 8x + 12} = \frac{1}{4}$$

$$4c) \lim_{x \rightarrow 49} \frac{\sqrt{x}-7}{x-49}$$

$$4c) \lim_{x \rightarrow 49} \frac{\sqrt{x}-7}{x-49} = \frac{1}{14}$$

5) Find the following limits using Algebra.

a) $\lim_{x \rightarrow \infty} \frac{8x^2+1}{2x^2+4x}$

5a) $\lim_{x \rightarrow \infty} \frac{8x^2+1}{2x^2+4x} = 4$

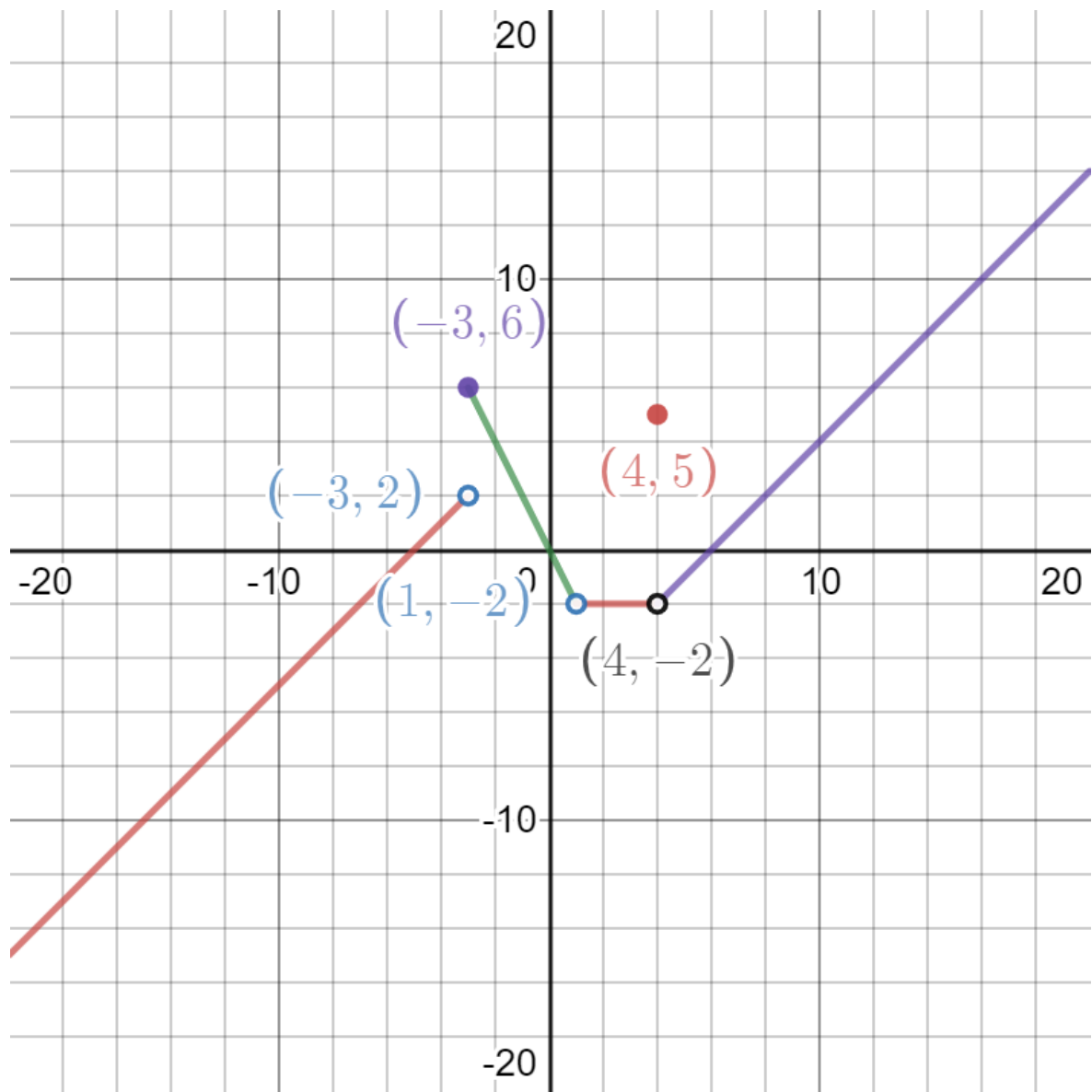
$$\text{b) } \lim_{x \rightarrow \infty} \frac{5x-4}{2x^2-x+2}$$

$$5\text{b) } \lim_{x \rightarrow \infty} \frac{5x-4}{2x^2-x+2} = 0$$

6) Find all values of $x = a$ where the function is not continuous (discontinuous.) State the informal reason the function is not continuous at each value of $x = a$.

Informally a function is **NOT CONTINUOUS** (or we can say the function is discontinuous) at a value of $x = a$ if one of three things happens on the graph of the function for that value of $x = a$

- 1) There is a hole in the graph of the function, and the function is undefined at that value of $x = a$.
- 2) There is a hole in the graph of the function at $x = a$ and the function is defined at the value of $x = a$.
- 3) There is a jump in the graph at the value of $x = a$
- 4) There is a vertical asymptote at the value of $x = a$



$x = -3$ There is a jump in the graph at $x = -3$.

$x = 1$ There is a hole in the graph of the function, and the function is undefined at $x = 1$

$x = 4$ There is a hole in the graph at $x = 4$ and the function is defined at $x = 4$

7) Find all values of $x = a$ where the function is not continuous (discontinuous.) State the informal reason the function is not continuous at each value of $x = a$.

Informally a function is **NOT CONTINUOUS** (or we can say the function is discontinuous) at a value of $x = a$ if one of three things happens on the graph of the function for that value of $x = a$

- 1) There is a hole in the graph of the function, and the function is undefined at that value of $x = a$.
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- 3) There is a jump in the graph at the value of $x = a$
- 4) There is a vertical asymptote at the value of $x = a$

$$7a) f(x) = \frac{x+3}{x^2+4x-5}$$

Not continuous at $x = -5, 1$ There is a vertical asymptote at both $x = -5$ and $x = 1$

$$7b) f(x) = 5x + 10$$

Function is continuous everywhere

Chapter 1 Practice Test Part 2

8) Find the average rate of change for each function over the given interval. It is not necessary to sketch a graph to model the average rate of change.

$$f(x) = x^3 + 5x \text{ between } x = 1 \text{ and } x = 2$$

8) Average rate of change = 12

9) $f(x) = x^2 + 3$

a) Use the definition of the derivative to find $f'(x)$

b) Find $f'(5)$

9a) $f'(x) = 2x$

9b) $f'(5) = 10$

$$10) f(x) = \frac{2}{x}$$

Find a formula to find the slope of a tangent line.

$$10) f'(x) = -\frac{2}{x^2}$$

11) A toy rocket is launched straight up so that its height s , in meters, at time t , in seconds, is given by $s(t) = -2t^2 + 20t$.

a) Find $s'(t)$

b) Find $s'(2)$

c) Interpret your answer to part b.

11a) $s'(t) = -4t + 20$

11b) $s'(2) = 12$

11c) velocity is 12 meters per second