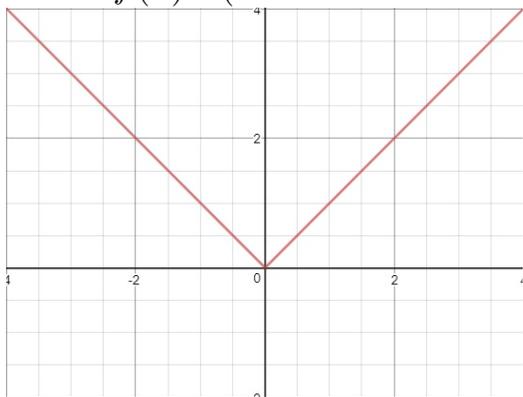


# Quiz Solution

March 21, 2018

1. (2 points) Given the graph of the **derivative**  $f'(x)$ , which of the following are true about  $f(x)$ ? (There are 2 correct answers!)



- (a)  $f(x)$  is always positive
- (b)  $f(x)$  is always increasing
- (c)  $f(x)$  is always concave up
- (d)  $f(x)$  has a critical value at  $x = 0$
- (e)  $f(x)$  has no inflection points

**Solution:** We have the following sign charts for  $f'(x)$  and  $f''(x)$  (remember that  $f''(x) > 0$  if  $f'(x)$  is increasing and  $f''(x) < 0$  if  $f'(x)$  is decreasing):

$$\begin{array}{c} f'(x) \\ x \end{array} \quad \begin{array}{c} + \quad 0 \quad + \\ \longleftarrow \quad | \quad \longrightarrow \\ 0 \end{array}$$

$$\begin{array}{c} f''(x) \\ x \end{array} \quad \begin{array}{c} - \quad 0 \quad + \\ \longleftarrow \quad | \quad \longrightarrow \\ 0 \end{array}$$

**Answer:** (b) and (d)

2. (2 points) Evaluate the following limit at infinity:  $\lim_{x \rightarrow \infty} \frac{x+7}{18-3x}$

**Solution:**

$$\begin{aligned} \lim_{x \rightarrow \infty} \frac{x+7}{18-3x} &= \lim_{x \rightarrow \infty} \frac{x}{-3x} \text{ by looking at the leading terms} \\ &= \lim_{x \rightarrow \infty} \frac{1}{-3} \\ &= -\frac{1}{3} \end{aligned}$$

**Answer:**  $-\frac{1}{3}$

3. (1 point) There are 15 quizzes. How many are left?

**Answer:** This is Quiz 11, so there are 4 quizzes left.