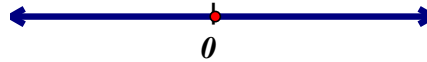


Assignment 1B: Domain, Range, & Intervals

For 1-5, represent each set of numbers using (a) a line graph, (b) Set-builder notation, and (c) interval notation. (Hint: try testing a range of x -values to get an idea of the set you are looking for. Use a graphing calculator if necessary.)

1. The set of all x -values such that $y = x^2 + 1$ is positive.

$$\{x|x \in \mathbb{R}\}, \quad (-\infty, \infty)$$



2. The set of all x -values such that $y = \sqrt{x}$ is a real number.

$$\{x|x \geq 0, x \in \mathbb{R}\}, \quad [0, \infty)$$



3. The set of all x -values such that $y = 1 - |x|$ is positive.

$$\{x|-1 < x < 1, x \in \mathbb{R}\}, \quad (-1, 1)$$



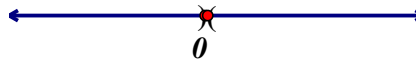
4. The set of all x -values such that $y = 1 - |x|$ is negative.

$$\{x|x < -1 \text{ or } x > 1, x \in \mathbb{R}\}, \quad (-\infty, -1) \cup (1, \infty)$$



5. The set of all x -values such that $y = x^2$ is a positive number
(Note: 0 is neither positive or negative).

$$\{x|x \neq 0, x \in \mathbb{R}\}, \quad (-\infty, 0) \cup (0, \infty)$$



6. James has a cell phone plan that includes 250 texts per month but charges \$.50 for each text over this limit.

- A. Use set builder notation to describe the set of all possible monthly totals that would not result in extra charges.

$$\{t|0 \leq t \leq 250, t \in \mathbb{Z}\}$$

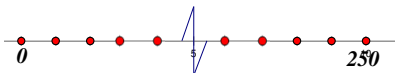
- B. Use set builder notation to describe the set of all possible monthly totals that would result in extra charges.

$$\{t|t > 250, t \in \mathbb{Z}\}$$

- C. Why does interval notation not work well to describe these sets?

*Because Texts have to be integers,
but interval notation only works for real numbers.*

- D. How could you accurately graph the set in part(a)?



7. Cammie has a cell phone plan that includes 250 minutes of calls per month but charges \$.50 for any calling time over this limit.

A. Describe the set of all possible monthly call totals that would not result in extra charges as an interval, set-builder, and graph.

$$\{x | x \in \mathbb{R}, 0 \leq x \leq 250\}$$

$$[0, 250]$$



B. Describe the set of all possible monthly call totals that would result in extra charges as an interval, set-builder, and graph.

$$\{x | x \in \mathbb{R}, x > 250\}$$

$$(250, \infty)$$



C. Why does interval notation work well to describe these sets?

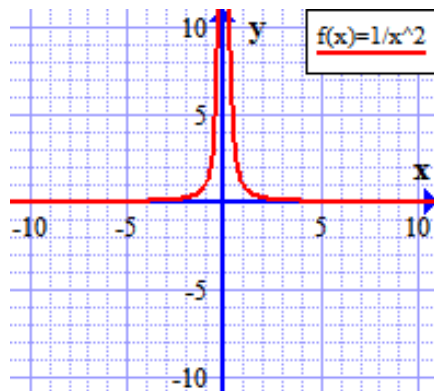
*The set includes all real numbers in the interval.
i.e. you can talk for exactly 3.1415926535 minutes if you want (if you're hungry for pi)!*

D.

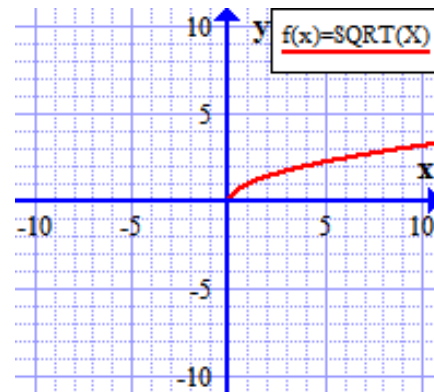
8. Use the graphs to describe the domain and range of each function using interval notation.

Reciprocal Squared: $f(x) = \frac{1}{x^2}$

Square Root: $f(x) = \sqrt{x}$

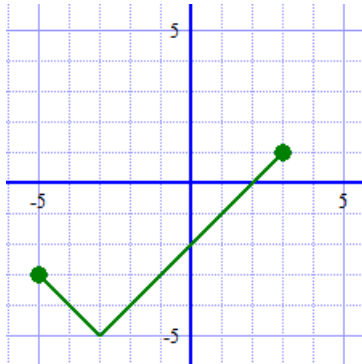


$D: (-\infty, 0) \cup (0, \infty); R: (0, \infty)$



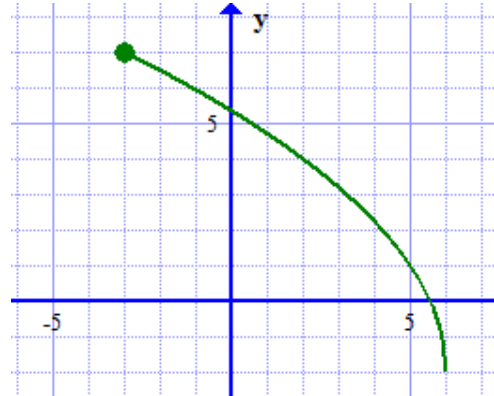
$D: [0, \infty); R: [0, \infty)$

$$f(x) = |x + 3| - 5$$



$$D: [-3, 6]; R: [-2, 7]$$

$$f(x) = 3\sqrt{6-x} - 2$$



$$D: [-5, 3]; R: [-5, 1]$$

State the domain of these functions in interval notation.

9. $y = \sqrt{8-x}$

$$D: (-\infty, 8]$$

10. $y = \sqrt{2x+6}$

$$D: [-3, \infty)$$

11. $y = \frac{1}{x-6}$

$$D: (-\infty, 6) \cup (6, \infty)$$

12. $y = \frac{1}{3x-5}$

$$D: \left(-\infty, \frac{5}{3}\right) \cup \left(\frac{5}{3}, \infty\right)$$