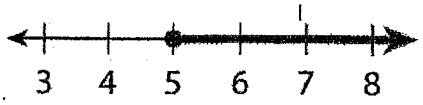
Math 2: Mod 1: lesson 1.1 Domain, Range & End behavior **Name:** Key **Per:**
Assignment #5

1. Write the interval shown on the number line as an inequality, using set notation, and using interval notation.



ineq.: $x \geq 5$
set not.: $\{x \in \mathbb{R} \mid x \geq 5\}$
inter. not.: $[5, \infty)$

2. Write the interval (5, 100] as an inequality and using set notation.

$5 < x \leq 100$ $\{x \in \mathbb{R} \mid 5 < x \leq 100\}$

3. Write the interval $-25 \leq x < 30$ using set notation and interval notation.

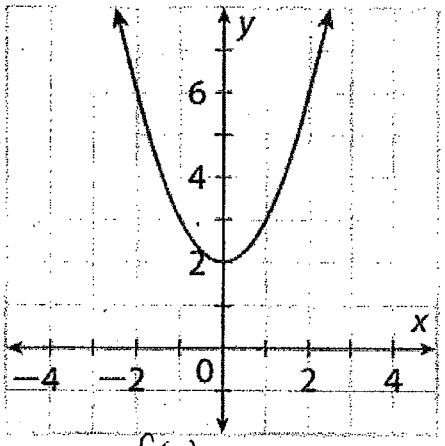
$[-25, 30)$ $\{x \in \mathbb{R} \mid -25 \leq x < 30\}$

4. Write the interval $\{x \mid -3 < x < 5\}$ as an inequality and using interval notation.

ineq: $-3 < x < 5$ $(-3, 5)$

Write the domain and the range of the function as an inequality, using set notation, and using interval notation. Also describe the *end behavior of the function or explain why there is no end behavior*

5. The graph of the quadratic function $f(x) = x^2 + 2$is shown.

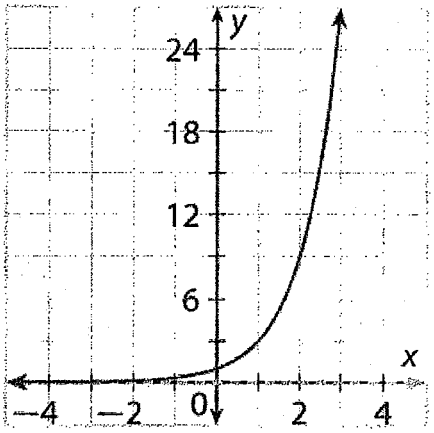


Domain
$(-\infty, \infty)$
$\{x \in \mathbb{R}\}$
$-\infty < x < \infty$

Range
$[2, \infty)$
$\{y \in \mathbb{R} \mid y \geq 2\}$
$y \geq 2$

$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

6. The graph of the exponential function $f(x) = 3^x$ is shown.

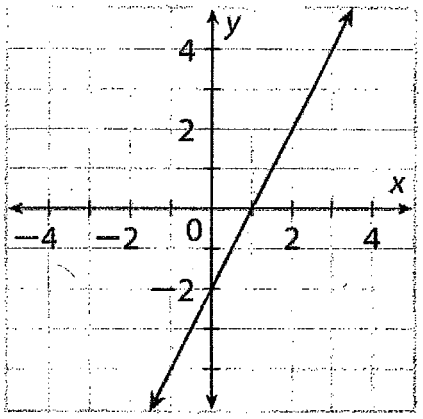


Domain
$(-\infty, \infty)$
$\{x \in \mathbb{R}\}$
$-\infty < x < \infty$

Range
$(0, \infty)$
$\{y \in \mathbb{R} \mid y > 0\}$
$y > 0$

$x \to \infty$ $f(x) \to \infty$ $x \to -\infty$ $f(x)$: none

7. The graph of the linear function g(x) = 2x - 2 is shown.

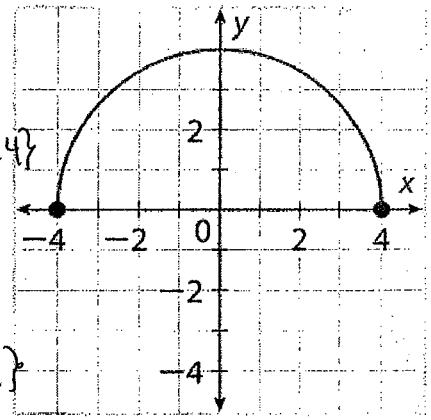


Domain
$(-\infty, \infty)$
$\{x \in \mathbb{R}\}$
$-\infty < x < \infty$

Range
$(-\infty, \infty)$
$\{y \in \mathbb{R}\}$
$-\infty < y < \infty$

$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x)$ $-\infty$

8. The graph of a function is shown.



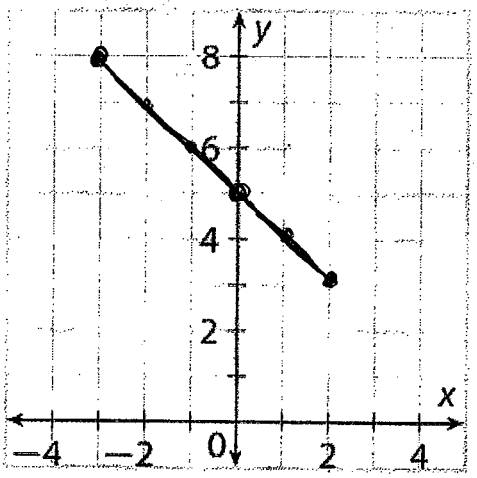
Domain:
$[-4, 4]$
$\{x \in \mathbb{R} \mid -4 \leq x \leq 4\}$
$-4 \leq x \leq 4$

Range
$[0, 4]$
$\{y \in \mathbb{R} \mid 0 \leq y \leq 4\}$
$0 \leq y \leq 4$

For the given function and domain, draw the graph and identify the range using the same notation as the given domain.

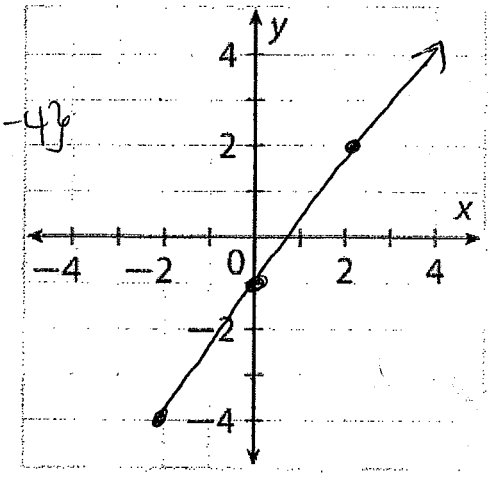
9. $f(x) = -x + 5$ with domain $[-3, 2]$

Range
$[3, 8]$



10. $f(x) = \frac{3}{2}x + 1$ with domain $\{x \mid x > -2\}$

Range
$\{y \in \mathbb{R} \mid y \geq -4\}$

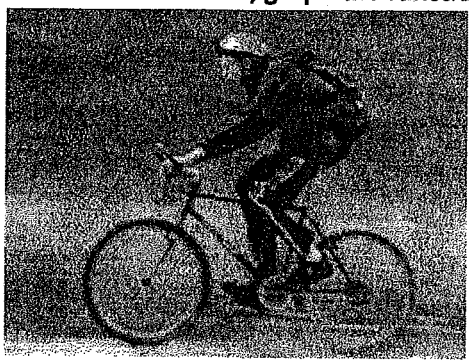


Write a function that models the given situation. Determine the domain from the situation, graph the function using that domain, and identify the range.

11. A bicyclist travels at a constant speed of 12 miles per hour for a total of 45 minutes. (Use set notation for the domain and range of the function that models this situation.)

$y = 12x$

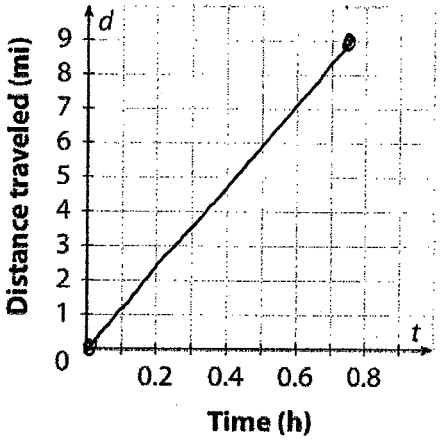
x	y
0	0
.75	9



$45\text{min} \cdot \frac{1\text{hr}}{60\text{min}} = .75$

{Domain: $x \in \mathbb{R} \mid 0 \leq x \leq .75$}

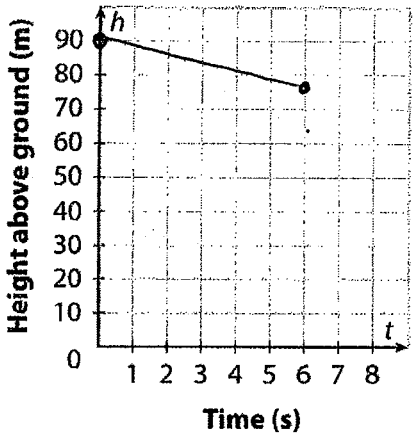
{Range $y \in \mathbb{R} \mid 0 \leq y \leq 9$}



12. An elevator in a tall building starts at a floor of the building that is 90 meters above the ground. The elevator descends 2 meters every 0.5 second for 6 seconds. (Use an inequality for the domain and range of the function that models this situation.)

$78 \leq y \leq 90$ ← Range

$0 \leq x \leq 6$ ← Domain



90m

41

ground

$4(3) = 12$