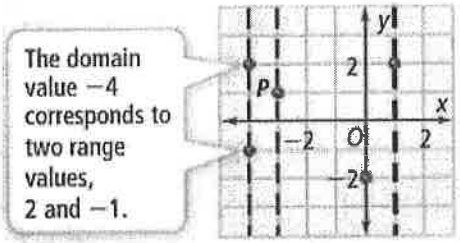
Algebra I
Section 4.6 Notes
Formalizing Relations and Functions

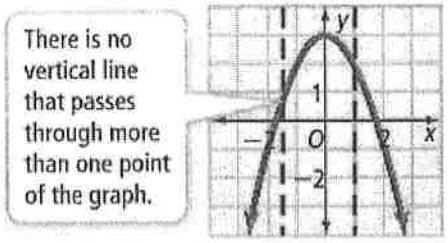
Name: Key

Key Definitions:

1. The domain is the ***x-values*** within a set.
2. The range is the ***y-values*** within a set.
3. The vertical line test is a technique used to determine whether a relation is a function or not.



The relation is not a function.



The relation is a function.

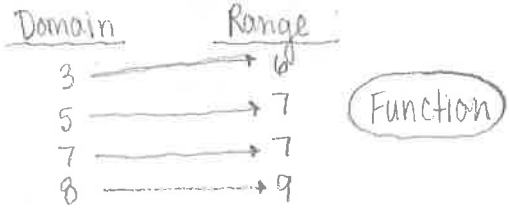
4. A function is usually written in function notation using $f(x)$.

Ex. $y = 3x - 1 \longrightarrow f(x) = 3x - 1$

Practice Problems

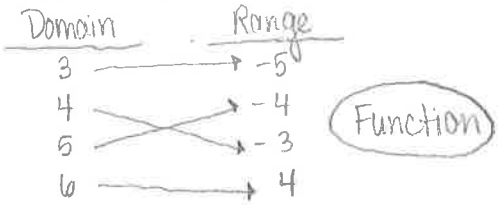
Identify the domain and range of each relation. Use a mapping diagram to determine whether the relation is a function.

1. {(3, 6), (5, 7), (7, 7) (8, 9)}

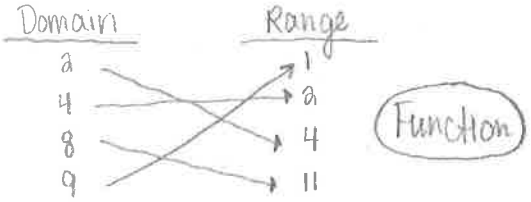


2. {(0, 0.4), (1, 0.8), (2, 1.2), (3, 1.6)}

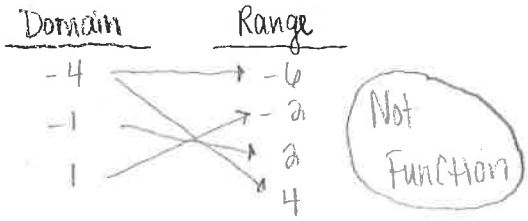
3. { (5, –4), (3, –5), (4, –3), (6, 4)}



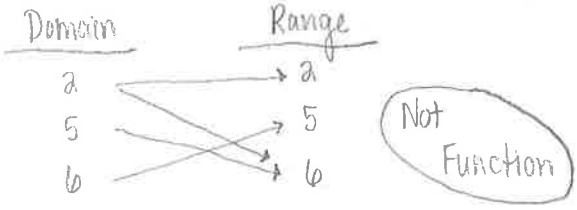
4. {(2, 4), (8, 11), (9, 1), (4, 2)}



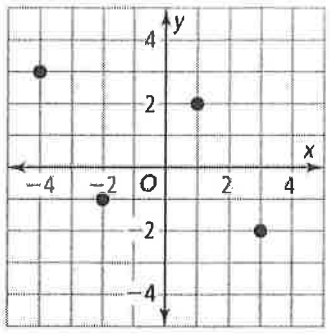
5. {(–4, –6), (1, –2), (–4, 4), (–1, 2)}



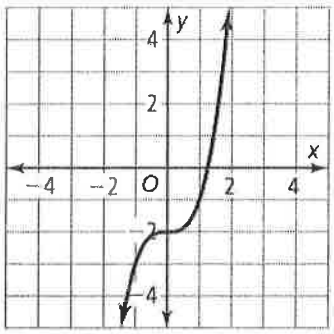
6. {(6, 5), (5, 6), (2, 2), (2, 6)}



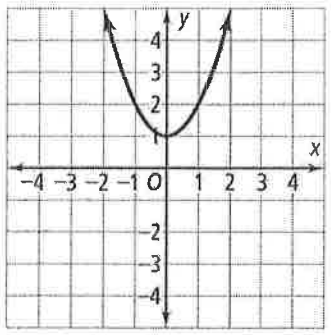
Use the vertical line test to determine whether the relation is a function.

7. 

Function

8. 

Function

9. 

Function

Find the range of each function for the given domain.

10. $f(x) = -3x + 2$; $\{-2, -1, 0, 1, 2\}$

$f(-2) = 8$ $f(1) = -1$

$f(-1) = 5$ $f(2) = -4$

$f(0) = 2$

11. $f(x) = 4x + 1$; $\{-4, -2, 0, 2, 4\}$

$f(-4) = -15$ $f(2) = 9$

$f(-2) = -7$ $f(4) = 17$

$f(0) = 1$

12. $f(x) = -4x + 3$; $\{-1, 0, 1, 2, 3\}$

$f(-1) = 7$ $f(2) = -5$

$f(0) = 3$ $f(3) = -9$

$f(1) = -1$

13. $f(x) = x^3 + 1$; $\{-2, -1, 0, 1, 2\}$

$f(-2) = -7$ $f(1) = 2$

$f(-1) = 0$ $f(2) = 9$

$f(0) = 1$

Answer each question given the specific function.

14. The function $w(x) = 60x$ represents the number of words $w(x)$ you can type in x minutes. How many words can you type in 9 minutes?

$w(9) = 60(9)$

$= 540$ words

15. Sound travels about 343 meters per second. The function $d(t) = 343t$ gives the distance $d(t)$ in meters that sound travels in t seconds. How far does sound sound travel in 8 seconds?

$d(8) = 343(8)$

$= 2,744$ meters

16. A tenth grade class is selling granola bars for a fundraiser. They earn \$0.75 for every granola bar that they sell. The function $P(b) = 0.75b$ represents the profit P the class earns for each bar b they sell. What is their profit if they sell 300 granola bars?

$P(300) = 0.75(300)$

$= \$225$

17. The function $t(x) = 150x$ represents the number of words $t(x)$ you can speak in x minutes. How many words can you speak in 20 minutes?

$t(20) = 150(20)$

$= 3,000$ words