

4.9

Domain and Range of a Relation

• Example 1

Find the domain and range for each relation.

(a) $A = \{(-2, 8), (1, 2), (-3, -5)\}$

The domain is the set $\{-2, 1, -3\}$. The range is the set $\{8, 2, -5\}$.

(b) $R = \{(1, 3), (1, 4), (1, 5)\}$

The domain is the set $\{1\}$. The range is the set $\{3, 4, 5\}$.

● ● ● CHECK YOURSELF 1

Find the domain and range for each relation.

a. $A = \{(-5, 4), (-4, 7), (-4, 9)\}$ b. $R = \{(1, 0), (3, 0), (5, 0)\}$

• Example 2

Find the domain and range for each relation.

(a) $A = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid x = 3\}$

The domain is $\{3\}$. The description of the relation defines x to always be 3. The range is the set \mathbb{R} of real numbers.

(b) $B = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = x\}$

The domain is the set of all real numbers, \mathbb{R} . The range is also the set of all real numbers, \mathbb{R} .

● ● ● CHECK YOURSELF 2

Find the domain and range for each relation.

a. $A = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = -1\}$ b. $B = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = x - 1\}$

● ● ● CHECK YOURSELF ANSWERS

1. (a) Domain: $\{-5, -4\}$, range: $\{4, 7, 9\}$;
(b) domain: $\{1, 3, 5\}$, range: $\{0\}$.
 2. (a) The domain is all real numbers, \mathbb{R} . The range is $\{-1\}$.
(b) The domain is the set of all real numbers, \mathbb{R} .
The range is also the set of all real numbers, \mathbb{R} .
-

4.9 Exercises

Name _____

Section _____

Date _____

A N S W E R S

Find the domain and range for each relation.

1. $\{(1, 2), (3, 4), (5, 6), (7, 8), (9, 10)\}$
2. $\{(2, 3), (3, 5), (4, 7), (5, 9), (6, 11)\}$
3. $\{(1, 2), (4, 6), (3, 3), (5, 4), (6, 1)\}$
4. $\{(3, 4), (5, 7), (6, 1), (2, 2), (4, 3)\}$
5. $\{(1, 2), (1, 3), (1, 4), (1, 5), (1, 6)\}$
6. $\{(3, 4), (3, 6), (3, 8), (3, 9), (3, 10)\}$
7. $\{(1, 5), (2, 5), (3, 6), (2, 4), (4, 5)\}$
8. $\{(2, 8), (3, 9), (2, 9), (3, 8), (4, 7)\}$
9. $\{(-1, 3), (-2, 4), (-3, 5), (4, 4), (5, 6)\}$
10. $\{(-2, 4), (1, 4), (-3, 4), (5, 4), (7, 4)\}$
11. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid x + 2y = 3\}$
12. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid 3x + 4y = 12\}$
13. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = 5\}$
14. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = -4\}$
15. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid x = 23\}$
16. $\{(x, y) \in \mathbb{R} \times \mathbb{R} \mid x = -9\}$

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____