

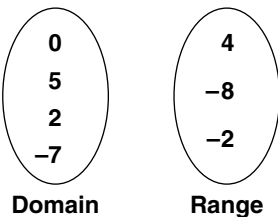
Chapter 2 Performance Assessment

Instructions: *Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problem.*

1. Bailey is vacationing at Myrtle Beach, South Carolina, this July. She likes to swim at low tide when the beach is wide and the waves are calm. She consults a tide chart to find the best time to swim.

July	2	3	4	5	6	7
Low tide	1:20	2:10	2:50	3:40	4:20	5:10

- Draw a scatter plot and write a prediction equation for the data.
 - Predict when low tide will be on July 8. Explain how you determined your prediction.
 - About what time was low tide on July 1?
 - How do you think the prediction equation would change if each low tide was 15 minutes later than the day before?
 - How do you think the prediction equation would change if low tides were about 15 minutes earlier than the day before?
2. a. Name two ways you can tell whether a relation is a function.
- b. Draw a mapping from the domain to the range that is a function.



- List a set of ordered pairs for a relation that is not a function. Explain why it is not a function.
- Graph $y \leq 3x + 5$. Is the relation a function? Why or why not?

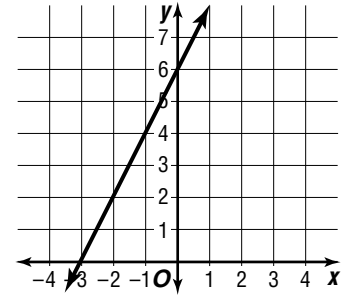
Enrichment

Two-Intercept Form of a Linear Equation

Any linear equation that can be written in the form $\frac{x}{a} + \frac{y}{b} = 1$ has x -intercept a and y -intercept b .

Example: Draw the graph of $\frac{x}{-3} + \frac{y}{6} = 1$.

The graph crosses the x -axis at -3 and the y -axis at 6 . Graph $(-3, 0)$ and $(0, 6)$, then draw a straight line through them.



Example: Write $3x + 4y = 12$ in two-intercept form.

Divide by 12 to obtain 1 on the right side.
Simplify.

The x -intercept is 4; the y -intercept is 3.

$$\frac{3x}{12} + \frac{4y}{12} = \frac{12}{12}$$

$$\frac{x}{4} + \frac{y}{3} = 1$$

Use the given intercepts a and b , to write an equation in two-intercept form. Then draw the graph.

1. $a = -2, b = -4$

2. $a = 1, b = 8$

3. $a = 3, b = 5$

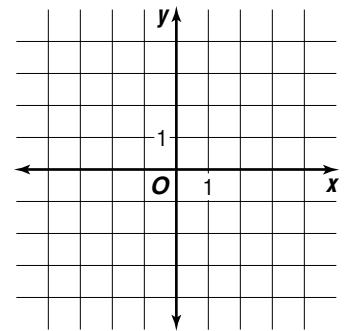
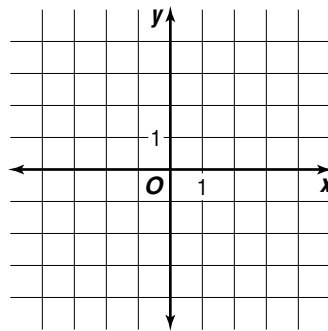
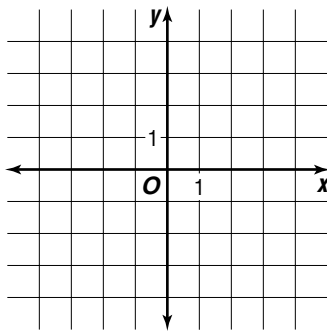
4. $a = 6, b = 9$

Write each equation in two-intercept form. Then draw the graph.

5. $3x - 2y = -6$

6. $\frac{1}{2}x + \frac{1}{4}y = 1$

7. $5x + 2y = -10$



Enrichment**Reading Mathematics**

The following paragraph states a result you might be asked to prove in a mathematics course. Parts of the paragraph are numbered.

- 01 Let n be a positive integer.
- 02 Also, let $n_1 = s(n_1)$ be the sum of the squares of the digits in n .
- 03 Then $n_2 = s(n_1)$ is the sum of the squares of the digits of n_1 , and $n_3 = s(n_2)$ is the sum of the squares of the digits of n_2 .
- 04 In general, $n_k = s(n_{k-1})$ is the sum of the squares of the digits of n_{k-1} .
- 05 Consider the sequence: $n, n_1, n_2, n_3, \dots, n_k, \dots$.
- 06 In this sequence either all the terms from some k on have the value 1,
- 07 or some term, say n_j , has the value 4, so that the eight terms 4, 16, 37, 58, 89, 145, 42, and 20 keep repeating from that point on.

Use the paragraph to answer these questions.

1. Use the sentence in line 01. List the first five values of n .
2. Use 9246 for n and give an example to show the meaning of line 02.
3. In line 02, which symbol shows a function? Explain the function in a sentence.
4. For $n = 9246$, find n_2 and n_3 as described in sentence 03.
5. How do the first four sentences relate to sentence 05?
6. Use $n = 31$ and find the first four terms of the sequence.
7. Which sentence of the paragraph is illustrated by $n = 31$?
8. Use $n = 61$ and find the first ten terms.
9. Which sentence is illustrated by $n = 61$?

Enrichment

Aerial Surveyors and Area

Many land regions have irregular shapes. Aerial surveyors often use coordinates when finding areas of such regions.

Step 1 List the ordered pairs for the vertices in counterclockwise order, repeating the first ordered pair at the bottom of the list.

Step 2 Find D , the sum of the downward diagonal products (from left to right).

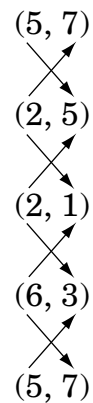
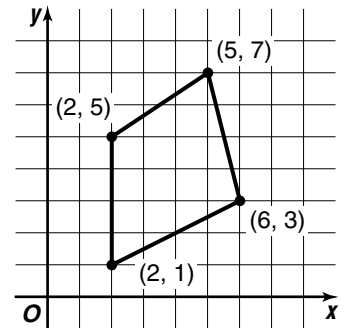
$$\begin{aligned} D &= (5 \cdot 5) + (2 \cdot 1) + (2 \cdot 3) + (6 \cdot 7) \\ &= 25 + 2 + 6 + 42 \text{ or } 75 \end{aligned}$$

Step 3 Find U , the sum of the upward diagonal products (from left to right).

$$\begin{aligned} U &= (2 \cdot 7) + (2 \cdot 5) + (6 \cdot 1) + (5 \cdot 3) \\ &= 14 + 10 + 6 + 15 \text{ or } 45 \end{aligned}$$

Step 4 Use the formula $A = \frac{1}{2}(D - U)$ to find the area.

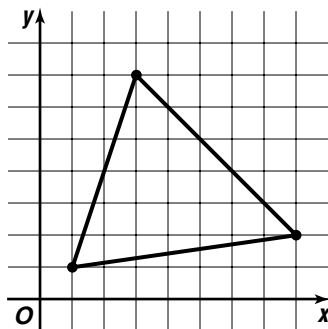
$$\begin{aligned} A &= \frac{1}{2}(75 - 45) \\ &= \frac{1}{2}(30) \text{ or } 15 \end{aligned}$$



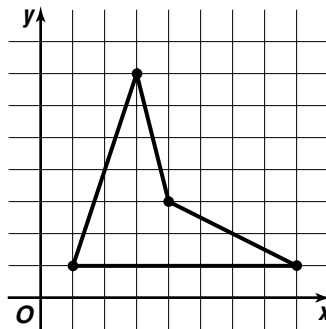
The area is 15 square units. Count the number of square units enclosed by the polygon. Does this result seem reasonable?

Use the coordinate method to find the area of each region in square units.

1.



2.



3.

