

Use the table to find the slope.

1.

x	2	3	4	5
y	4	11	18	25

$$m = \frac{7}{1} = 7$$

2.

x	14	28	42	56	70
y	17	20	23	26	29

$$m = \frac{20-17}{28-14} = \frac{3}{14}$$

3.

x	5	21	37	53
y	11	27	43	49

$$\frac{27-11}{21-5} = \frac{16}{16}$$

$$m = 1$$

4.

x	0	4	8	12	16
y	4	8	12	16	20

$$\frac{8-4}{4-0} = \frac{4}{4} = 1$$

Warm Up

Tell which number you would add to or subtract from each side of the inequality to solve.

1. $k - 12 > -4$

$$k > 8$$

2. $0 \leq b + 8$

$$-8 \leq b$$

3. $x + 5 > -6$

$$x > -11$$

4. $7 \leq m + 2$

$$5 \leq m$$

5. $r - 2 > 6$

$$r > 8$$

6. $8 + w > 8$

$$w > 0$$

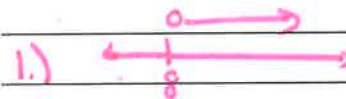
* Calculate Slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

* Simplify when possible

* Review order of operations

* discuss what the graph would look like...



Cumulative Warm Up

Essential Question

How can you use an arithmetic sequence to describe a pattern?

What you will learn

• Write the terms of arithmetic sequences

• Graph arithmetic sequences

• Write arithmetic sequences as functions

Essential Question

*partner work

The y-value increases by 10 as the x value increases by 1.

Work with a partner. Use the figures to complete the table. Plot the points given by your completed table. Describe the pattern of the y-values.

a. $n = 1$ $n = 2$ $n = 3$ $n = 4$ $n = 5$

Number of stars, n	1	2	3	4	5
Number of sides, y	10	20	30	40	50

y-value increases by 1 each time

Work with a partner. Use the figures to complete the table. Plot the points given by your completed table. Describe the pattern of the y-values.

b. $n = 1$ $n = 2$ $n = 3$ $n = 4$ $n = 5$

n	1	2	3	4	5
Number of circles, y	2	3	4	5	6

Exploration 1b

y-value increases by 2 each time

Work with a partner. Use the figures to complete the table. Plot the points given by your completed table. Describe the pattern of the y-values.

c. $n = 1$ $n = 2$ $n = 3$ $n = 4$ $n = 5$

Number of rows, n	1	2	3	4	5
Number of dots, y	2	4	6	8	10

Exploration 1c

Core Concept
Arithmetic Sequence
 In an arithmetic sequence, the difference between each pair of consecutive terms is the same. This difference is called the **common difference**. Each term is found by adding the common difference to the previous term.

5, 10, 15, 20, ... Terms of an arithmetic sequence

+5 +5 +5 ← common difference

Core Concept

Sequence: an ordered list of numbers

arithmetic sequence: the difference between each pair of consecutive terms is the same.

common difference: each term is found by adding the common difference to the previous term.

Write the next three terms of the arithmetic sequence.

-7, -14, -21, -28, ...

+(-7) +(-7) +(-7)

Common diff = -7

-35, -42, -49

Example 1

Write the next three terms of the arithmetic sequence.

1. $-12, 0, 12, 24, \dots$

$36, 48, 60$

2. $0.2, 0.6, 1, 1.4, \dots$

$1.8, 2.2, 2.6$

3. $4, 3\frac{3}{4}, 3\frac{1}{2}, 3\frac{1}{4}, \dots$

$3, 2\frac{3}{4}, 2\frac{1}{2}$

Monitoring Progress 1-3

Graph the arithmetic sequence $4, 8, 12, 16, \dots$. What do you notice?

* Student 1 practice

* Use graph

* how do points line up?

- create a line

- Student may relate to slope.

Does the graph represent an arithmetic sequence? Explain.

line up y-values

• Is there a common difference?

+ (-3) for each term

• Graph represents an arithmetic sequence b/c there is a common difference.

Example 3

Graph the arithmetic sequence. What do you notice?

4. 3, 6, 9, 12, ... 5. 4, 2, 0, -2, ... 6. 1, 0.8, 0.6, 0.4, ...

7. Does the graph shown represent an arithmetic sequence? Explain.

* student practice

Core Concept

Equation for an Arithmetic Sequence

Let a_n be the n th term of an arithmetic sequence with first term a_1 and common difference d . The n th term is given by

$$a_n = a_1 + (n - 1)d.$$

1	first term	a_1	a_1
2	2nd term	a_2	$a_1 + d$
3	3rd term	a_3	$a_1 + 2d$
4	4th term	a_4	$a_1 + 3d$
n th	n th term	a_n	$a_1 + (n - 1)d$

example

$$4$$

$$4 + 3 = 7$$

$$4 + 3(2) = 10$$

$$4 + 3(3) = 13$$

$$4 + (n - 1)(3)$$

Core Concept

Write an equation for the n th term of the arithmetic sequence 14, 11, 8, 5, ... Then find a_{50} .

$$\begin{aligned} a_n &= a_1 + (n - 1)d \\ &= 14 + (n - 1)(-3) \\ &= -3n + 17 \end{aligned}$$

$$\begin{aligned} a_{50} &= -3(50) + 17 \\ &= -133 \end{aligned}$$

Write an equation for the n th term of the arithmetic sequence.
Then find a_{25} .

8. 4, 5, 6, 7, ...

9. 8, 16, 24, 32, ...

10. 1, 0, -1, -2, ...

Student practice

$$a_n = a_1 + (n-1)d$$

Use the formula

Monitoring Progress 8-10

Online bidding for a purse
increases by \$5 for each bid
after the \$60 initial bid.

Bid Number	1	2	3	4
Bid Amount	\$60	\$65	\$70	\$75

- Write a function that represents the arithmetic sequence.
- Graph the function.
- The winning bid is \$105. How many bids were there?

$$f(n) = a_1 + (n-1)d$$

$$f(n) = 60 + (n-1)5$$

$$f(n) = 5n + 55$$

b.) make a table

Bid # n	Bid amount a_n
1	60
2	65
3	70
4	75

$$c.) f(n) = 5n + 55$$

$$105 = 5n + 55$$

$$10 = 5n$$

10 bids

* Student practice

11. A carnival charges \$2 for each game after you pay a \$5 entry fee.
- a. Write a function that represents the arithmetic sequence.
 - b. Graph the function.
 - c. How many games can you play when you take \$29 to the carnival?

Games	1	2	3	4
Total Cost	\$7	\$9	\$11	\$13

Monitoring Progress 11

3-2-1: Hand out a reflection sheet as described in the *Formative Assessment Tips*.

