

4-1 Using Graphs to Relate Quantities

Mr. White is eating Skittles at a steady rate. Use the graph to the right to answer questions 1-5. Answer in complete sentences.

1. How long does it take Mr. White to eat all the candies?

It takes Mr. White 20 minutes to eat all of the candies.

2. How many candies does Mr. White have left after 5 minutes?

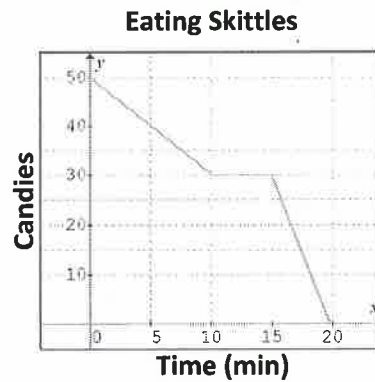
Mr. White has 40 candies left after 5 minutes.

3. How long does it take Mr. White to eat his last 30 candies?

It takes Mr. White only 5 minutes to eat his last 30 candies.

4. How many candies does Mr. White eat in the first 10 minutes?

Mr. White eats 20 candies in the first 10 minutes.



5. When Mr. White is eating candies the fastest, how many candies does he eat every minute?

$$\frac{30 \text{ candies}}{10 \text{ min}} = 3 \text{ candies/min}$$

Mr. White eats 3 candies per minute whenever he's eating candies the fastest.

4-2 Patterns and Linear Functions

Use the table at the right to answer questions 1-4:

1. Is the relationship linear? Explain how you know.

Yes. Every time x goes up by 1, y goes up by 2.

	x	y	
+1	0	-3	+2
+1	1	-1	+2
+1	2	1	+2
+1	3	3	+2
+1	4	5	+2

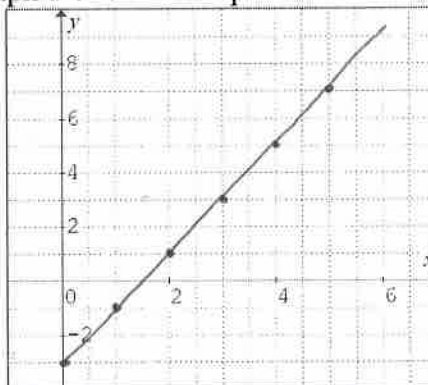
2. Express the relationship using words.

Double the x number and subtract 3 to get y .

3. Express the relationship using an equation.

$$y = 2x - 3$$

4. Graph the relationship



5. Determine whether the set of order pairs shown represents a linear relationship. Explain how you know. $\{(0, -3), (1, 2), (2, 7), (4, 17), (6, 27)\}$

Yes. Every time x increases by 1, y increases by 5. (So when x increases by 2, y increases by 10.)

4-3 Patterns and Nonlinear FunctionsUse the function rule $d(t) = 8 - t^2$ to answer questions 1-4:1. Find $d(0)$

$$\begin{aligned} d(0) &= 8 - (0)^2 \\ &= 8 - 0 = \boxed{8} \end{aligned}$$

2. Find $d(-1)$

$$\begin{aligned} d(-1) &= 8 - (-1)^2 \\ &= 8 - 1 = \boxed{7} \end{aligned}$$

3. Find $d(2)$

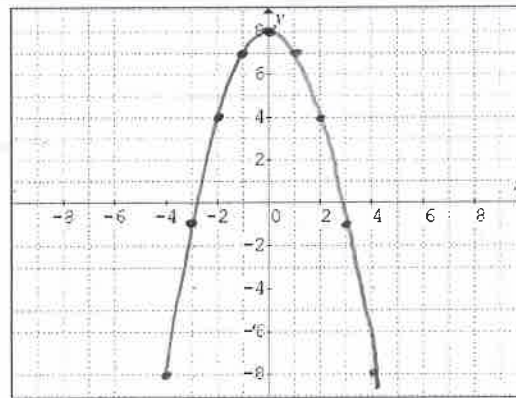
$$\begin{aligned} d(2) &= 8 - (2)^2 \\ &= 8 - 4 = \boxed{4} \end{aligned}$$

4. Find $d(-3)$

$$\begin{aligned} d(-3) &= 8 - (-3)^2 \\ &= 8 - 9 = \boxed{-1} \end{aligned}$$

5. Graph the function

x	y
4	-8
3	-1
2	4
1	7
0	8
1	7
2	4
3	-1
4	-8

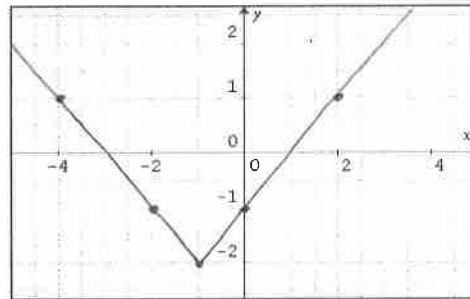


4-4 Graphing a Function RuleUse the function rule $f(x) = |x+1| - 2$ to answer questions 1-2:

1. Complete the data table

x	f(x)
-4	1
-2	-1
0	-1
2	1

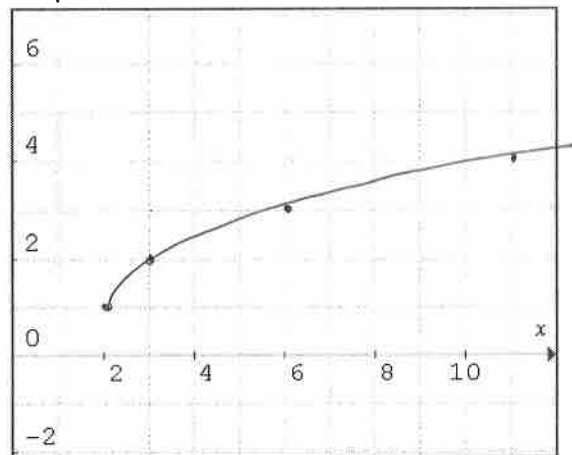
2. Graph the function

Use the function rule $g(x) = \sqrt{x-2} + 1$ to answer questions 3-4:

3. Complete the data table

x	g(x)
2	1
3	2
6	3
11	4

4. Graph the function

5. Is the point (-3, -14) on the graph of the function? $y = -x^2 - 5$ Show how you know.

$$-14 = -(-3)^2 - 5$$

$$-14 = -9 - 5$$

$$-14 = -14 \checkmark$$

Yes!

4-5 Writing a Function Rule

Write a function rule that represents each situation:

- 1.
- y
- is 9 less than the quotient of 6 and
- x

$$y = \frac{6}{x} - 9$$

2. 3 less than four sevenths of
- x
- is
- y

$$y = \frac{4}{7}x - 3$$

3. The time (
- T
-) run by a cross-country runner (in minutes) is a function of the number of laps (
- L
-) run on the track, at the rate of 1.75 minutes per lap.

$$T = 1.75L$$

4. The cost (
- C
-) of a concrete pump is \$75 per hour plus a \$100 one-time fuel charge.

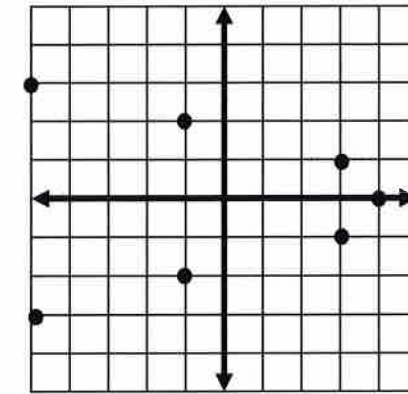
$$C = 75h + 100$$

5. Write a function rule for the area (
- A
-) of a rectangle with a height that is 1 more than triple its base (
- b
-).

$$A = b(3b + 1)$$

4-6 Relations and Functions

Use the graph to the right to answer questions 1-4:



1. Give the domain: $\{-5, -1, 3, 4\}$

2. Give the range: $\{-3, -2, -1, 0, 1, 2, 3\}$

3. Does the graph represent a function?

No.

4. Explain how you know the answer to #3.

It fails the vertical line test.
Some x-values have more than one y-value.

5. Find the range of the following function for the given domain. $y = -\sqrt{x+2}$ $D: \{-2, 2, 7\}$

Range: $\{-3, -2, 0\}$

$$y = -\sqrt{-2+2}$$

$$= -\sqrt{0} = 0$$

$$y = -\sqrt{2+2}$$

$$= -\sqrt{4} = -2$$

$$y = -\sqrt{7+2}$$

$$= -\sqrt{9} = -3$$