Unit 2: Reasoning with Linear Equations and Inequalities

2.1 Solving Equations and Inequalities in One Variable

SAMPLE ITEMS

1. This equation can be used to find h, the number of hours it will take Flo and Bryan to mow their lawn.

$$\frac{h}{3} + \frac{h}{6} = 1$$

How many hours will it take them to mow their lawn?

A. 6
B. 3
C. 2
D. 1

2. A ferry boat carries passengers back and forth between two communities on the Peachville River.

- It takes 30 minutes longer for the ferry to make the trip upstream than downstream.
- The ferry's average speed in still water is 15 miles per hour.
- The river's current is usually 5 miles per hour.

This equation can be used to determine how many miles apart the two communities are.

$$\frac{m}{15-5} = \frac{m}{15+5} + 0.5$$

What is m, the distance between the two communities?

A. 0.5 mile
B. 5 miles
C. 10 miles
D. 15 miles

3. For what values of x is the inequality $\frac{2}{3} + \frac{x}{3} > 1$ true?

A. $x < 1$
B. $x > 1$
C. $x < 5$
D. $x > 5$

4. Look at the steps used when solving $3(x - 2) = 3$ for x.

$3(x - 2) = 3$	Write the original equation.
$3x - 6 = 3$	Use the Distributive Property.
$3x - 6 + 6 = 3 + 6$	Step 1
$3x = 9$	Step 2
$\frac{3x}{3} = \frac{9}{3}$	Step 3
$x = 3$	Step 4

Which step is the result of combining like terms?

A. Step 1
B. Step 2
C. Step 3
D. Step 4

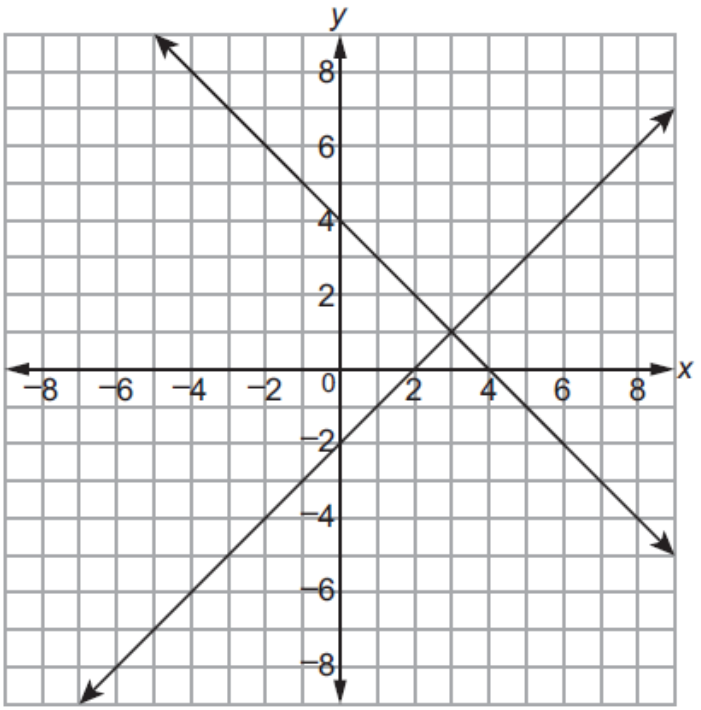
Answers to Unit 2.1 Sample Items

1. C 2. C 3. B 4. B

2.2 Solving a System of Two Linear Equations

SAMPLE ITEMS

1. Two lines are graphed on this coordinate plane.



Which point appears to be a solution of the equations of both lines?

A. (0, –2)
B. (0, 4)
C. (2, 0)
D. (3, 1)

2. Based on the tables, at what point do the lines $y = -x + 5$ and $y = 2x - 1$ intersect?

$y = -x + 5$	
x	y
–1	6
0	5
1	4
2	3
3	2

$y = 2x - 1$	
x	y
–1	–3
0	–1
1	1
2	3
3	5

A. (1, 1)
B. (3, 5)
C. (2, 3)
D. (3, 2)

3. Which ordered pair is a solution of $3y + 2 = 2x - 5$?

   A. (–5, 2)
   B. (0, –5)
   C. (5, 1)
   D. (7, 5)

4. A manager is comparing the cost of buying baseball caps from two different companies.

   - Company X charges a $50 fee plus $7 per baseball cap.
   - Company Y charges a $30 fee plus $9 per baseball cap.

   For what number of baseball caps will the cost be the same at both companies?

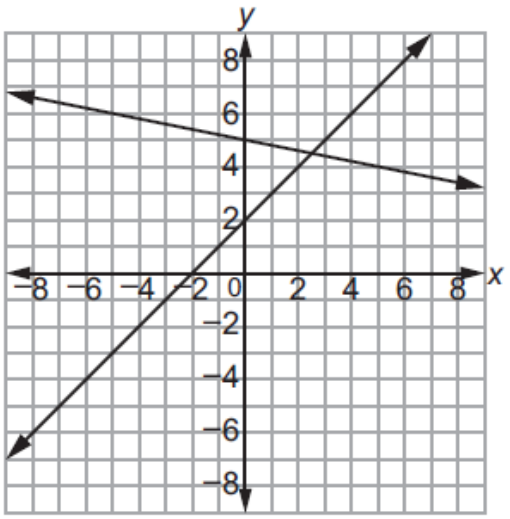
   A. 10
   B. 20
   C. 40
   D. 100

5. A shop sells one-pound bags of peanuts for $2 and three-pound bags of peanuts for $5. If 9 bags are purchased for a total cost of $36, how many three-pound bags were purchased?

   A. 3
   B. 6
   C. 9
   D. 18

6. **Which graph represents a system of linear equations that has multiple common coordinate pairs?**

A.



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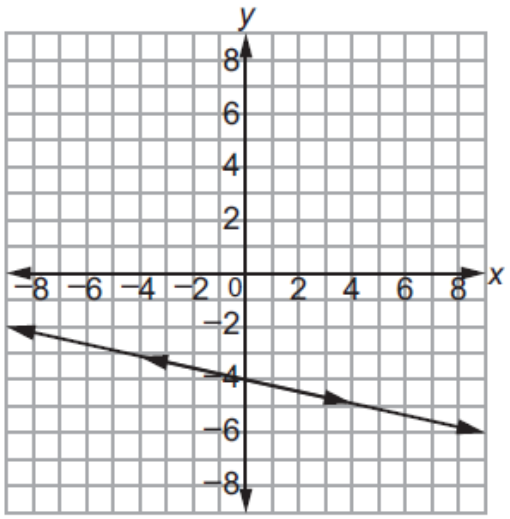

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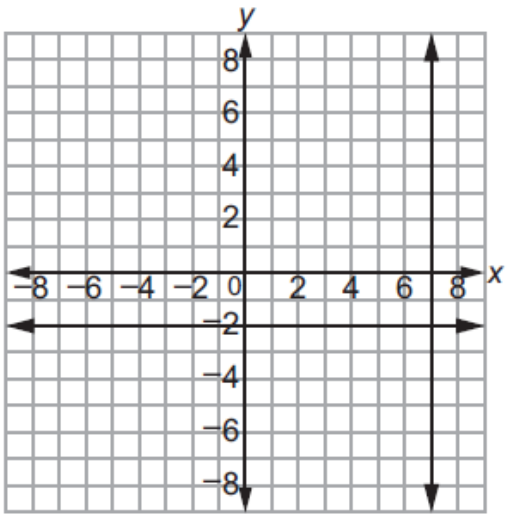
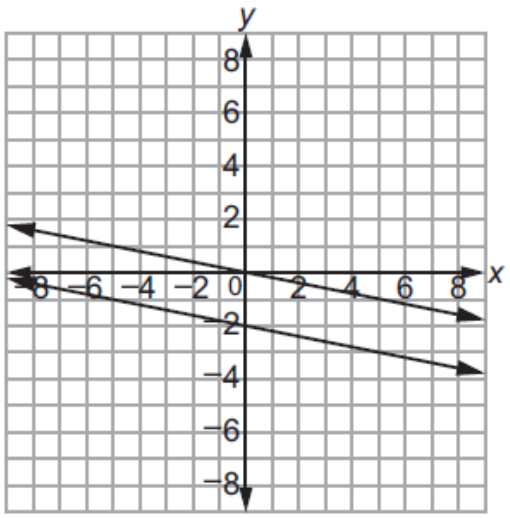


D.



Answers to Unit 2.2 Sample Items

1. D 2. C 3. C 4. A 5. B 6. B

2.3 Represent and Solve Equations and Inequalities Graphically

No Sample Items

2.4 Build a Function That Models a Relationship between Two Quantities

SAMPLE ITEM

1. Which function represents the sequence?

n	1	2	3	4	5	. . .
a_n	3	10	17	24	31	. . .

A. $f(n) = n + 3$
B. $f(n) = 7n - 4$
C. $f(n) = 3n + 7$
D. $f(n) = n + 7$

Answer to Unit 2.4 Sample Item

1. B

2.5 Understand the Concept of a Function and Use Function Notation

SAMPLE ITEMS

1. Look at the sequence in this table.

n	1	2	3	4	5	. . .
a_n	−1	1	3	5	7	. . .

Which function represents the sequence?

A. $a_n = a_{n-1} + 1$
B. $a_n = a_{n-1} + 2$
C. $a_n = 2a_{n-1} - 1$
D. $a_n = 2a_{n-1} - 3$

2. **Which function is modeled in this table?**

x	$f(x)$
1	8
2	11
3	14
4	17

A. $f(x) = x + 7$
B. $f(x) = x + 9$
C. $f(x) = 2x + 5$
D. $f(x) = 3x + 5$

3. **Which explicit formula describes the pattern in this table?**

d	C
2	6.28
3	9.42
5	15.70
10	31.40

A. $d = 3.14 \times C$
B. $3.14 \times C = d$
C. $31.4 \times 10 = C$
D. $C = 3.14 \times d$

4. **If $f(12) = 4(12) - 20$, which function gives $f(x)$?**

A. $f(x) = 4x$
B. $f(x) = 12x$
C. $f(x) = 4x - 20$
D. $f(x) = 12x - 20$

Answers to Unit 2.5 Sample Items

1. B 2. D 3. D 4. C

2.6 Interpret Functions that Arise in Applications in Terms of the Context

SAMPLE ITEM

1. A wild horse runs at a rate of 8 miles an hour for 6 hours. Let y be the distance, in miles, the horse travels for a given amount of time, x, in hours. This situation can be modeled by a function.

   Which of these describes the domain of the function?

   A. $0 \leq x \leq 6$
   B. $0 \leq y \leq 6$
   C. $0 \leq x \leq 48$
   D. $0 \leq y \leq 48$

Answer to Unit 2.6 Sample Item

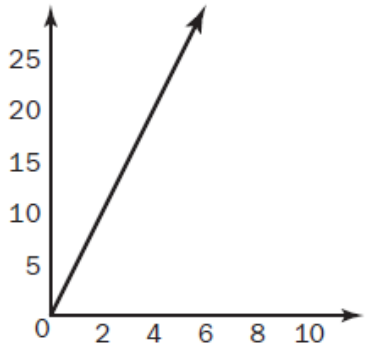
1. A

2.7 Analyze Functions Using Different Representations

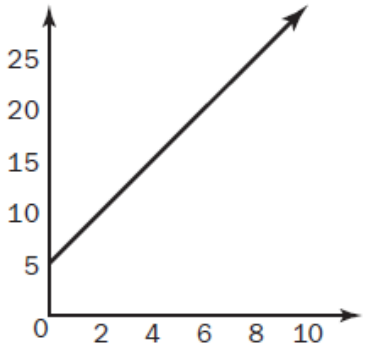
SAMPLE ITEMS

1. To rent a canoe, the cost is $3 for the oars and life preserver, plus $5 an hour for the canoe. Which graph models the cost of renting a canoe?

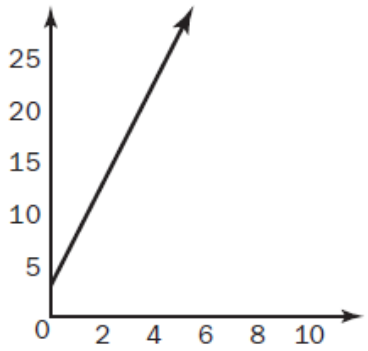
A.



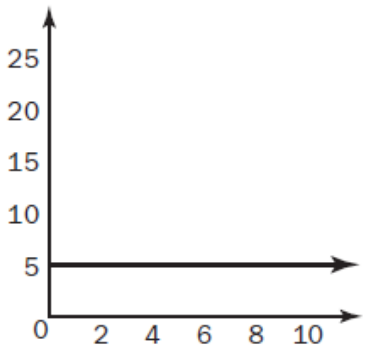
B.



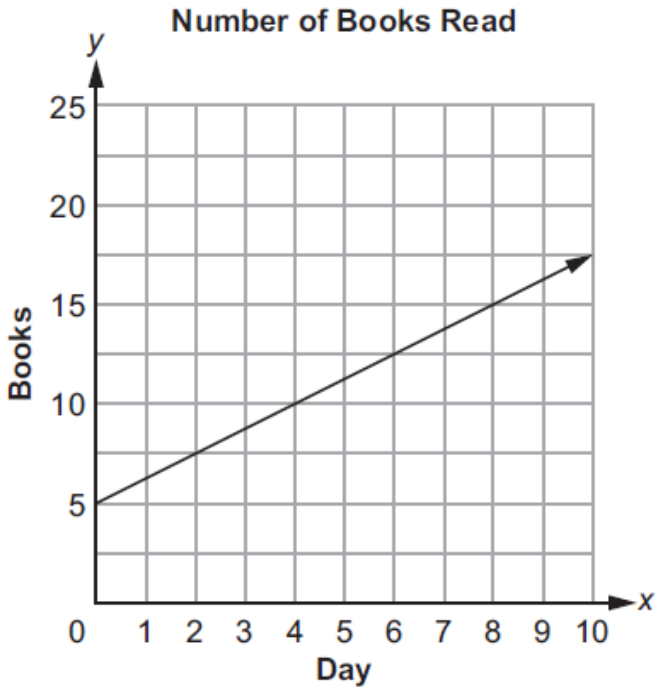
C.



D.



2. Juan and Patti decided to see who could read more books in a month. They began to keep track after Patti had already read 5 books that month. This graph shows the number of books Patti read for the next 10 days and the rate at which she will read for the rest of the month.



If Juan does not read any books before day 4 and he starts reading at the same rate as Patti for the rest of the month, how many books will he have read by day 12?

A. 5
B. 10
C. 15
D. 20

Answers to Unit 2.7 Sample Items

1. C 2. B