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Lesson 8.2 Writing Linear Equations

Write an algebraic expression for each of the following.

1. The sum of 6 and *u*.

_____

2. The difference "*w* less than 9."

_____

3. Divide *z* by 8.

_____

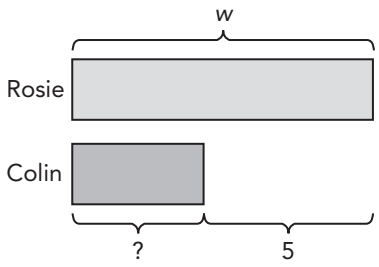
4. The product of *s* and 10.

_____

Write a linear equation for each of the following. Then state the independent and dependent variables for each equation.

Example

Rosie has *w* books. Colin has 5 fewer books than Rosie.



a) Write an expression for the number of books that Colin has in terms of *w*.

Colin's has *w* (–) *5* books.

b) If Colin has *p* books, express *p* in terms of *w*.

p = *w* (–) *5*

p = *w* − *5* is called a **linear equation**.

c) State the independent and dependent variables.

Independent variable: *w*, Dependent variable: *p*

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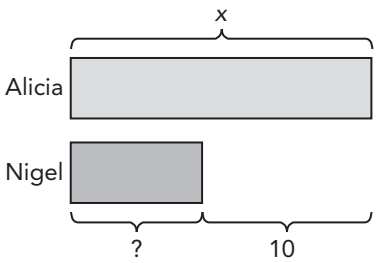
5. Alicia has x picture cards. Nigel has 10 fewer picture cards than Alicia.



a) Write an expression for the number of picture cards that Nigel has in terms of x.

Nigel has _____ ◯ _____ picture cards.

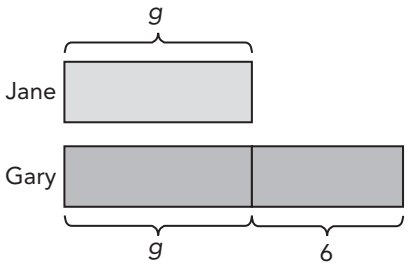
b) If Nigel has y picture cards, express y in terms of x.

_____ = _____ ◯ _____

c) State the independent and dependent variables.

Independent variable: _____, Dependent variable: _____

6. Jane is g years old. Gary is 6 years older.



a) Write an expression for Gary's age in terms of g.

Gary's age is _____ ◯ _____ years.

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b) If Gary is h years old, express h in terms of g.

_____ = _____ ◯ _____

c) State the independent and dependent variables.

Independent variable: _____, Dependent variable: _____

7. A shirt costs t dollars. A pair of jeans costs $35 more than the shirt.

a) Write an expression for the cost of the pair of jeans in terms of g.

b) If the pair of jeans costs u dollars, express u in terms of t.

c) State the independent and dependent variables.

8. Joseph finished a test in g minutes. Catherine finished the same test in 8 minutes less than Joseph.

a) Write an expression for the number of minutes it took Catherine to finish the test, in terms of g.

b) If Catherine finished the test in v minutes, express v in terms of g.

c) State the independent and dependent variables.

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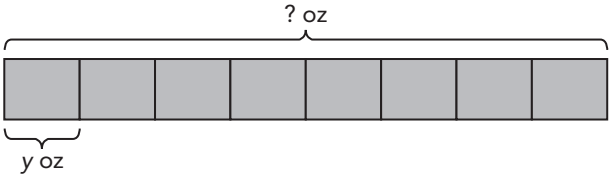
Write a linear equation for each of the following. Then state the independent and dependent variables for each equation.

Example

Shannen served 8 glasses of punch to her guests. Each glass contained *y* ounces of punch.



a) Write an expression for the number of ounces of punch Shannen served, in terms of *y*.

Shannen served 8 · y = 8y ounces of punch.

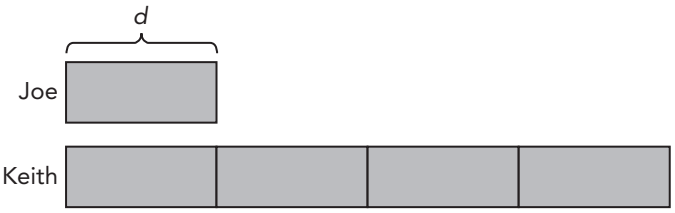
b) If Shannen served *b* ounces of punch, express *b* in terms of *y*.

b = 8y

c) State the independent and dependent variables.

Independent variable: y, Dependent variable: b

9. Joe took *d* photos of a birthday party. Keith took 4 times as many photos as Joe.



a) Write an expression for the number of photos that Keith took in terms of *d*.

Keith took _____ ○ _____ = _____ photos.

b) If Keith took *g* photos, express *g* in terms of *d*.

_____ = _____

c) State the independent and dependent variables.

Independent variable: _____, Dependent variable: _____

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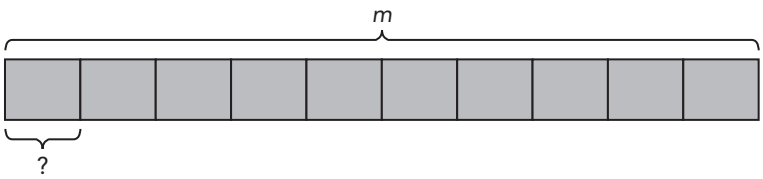
10. Joey bought *m* stickers. He divided the stickers among 10 children equally.



a) Write an expression for the number of stickers each child received in terms of *m*.

Each child received _____ ◯ _____ = $\frac{\square}{\square}$ stickers.

b) If each child received *w* stickers, express *w* in terms of *m*.

_____ = $\frac{\square}{\square}$

c) State the independent and dependent variables.

Independent variable: _____, Dependent variable: _____

11. Winston is *n* years old. His father is 3 times as old as Winston.

a) Write an expression for the age of Winston's father in terms of *n*.

b) If Winston's father is *s* years old, express *s* in terms of *n*.

c) State the independent and dependent variables.

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12. Arthur paid b dollars for 5 pairs of socks.

a) Write an expression for the cost of a pair of socks in terms of b.

b) If a pair of socks costs k dollars, express k in terms of b.

c) State the independent and dependent variables.

13. The height of a table is r meters. The table is twice as tall as a chair.

a) Write an expression for the height of the chair in terms of r.

b) If the height of the chair is t meters, express t in terms of r.

c) State the independent and dependent variables.

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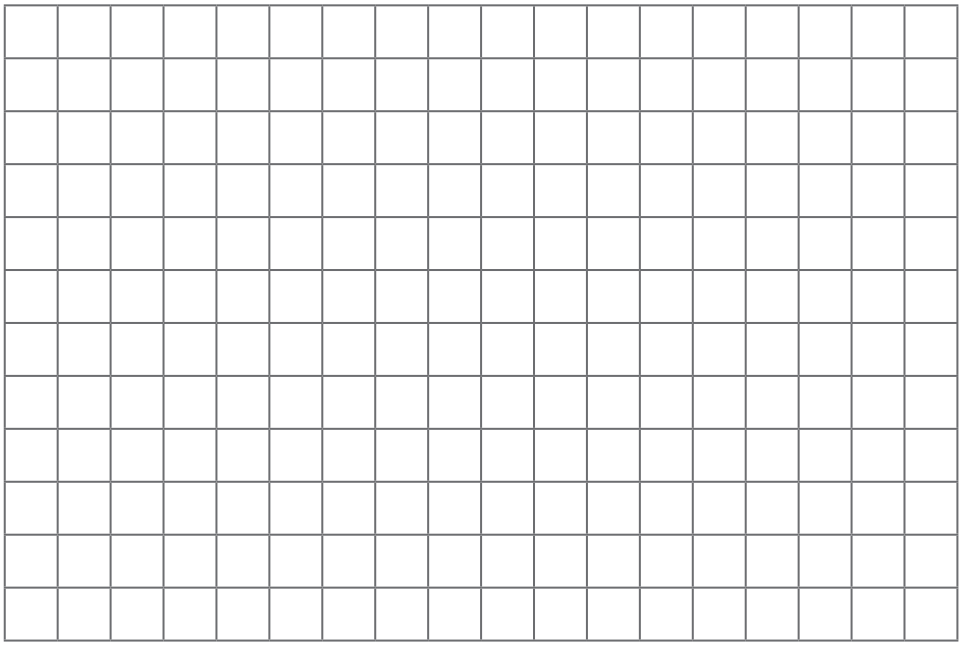
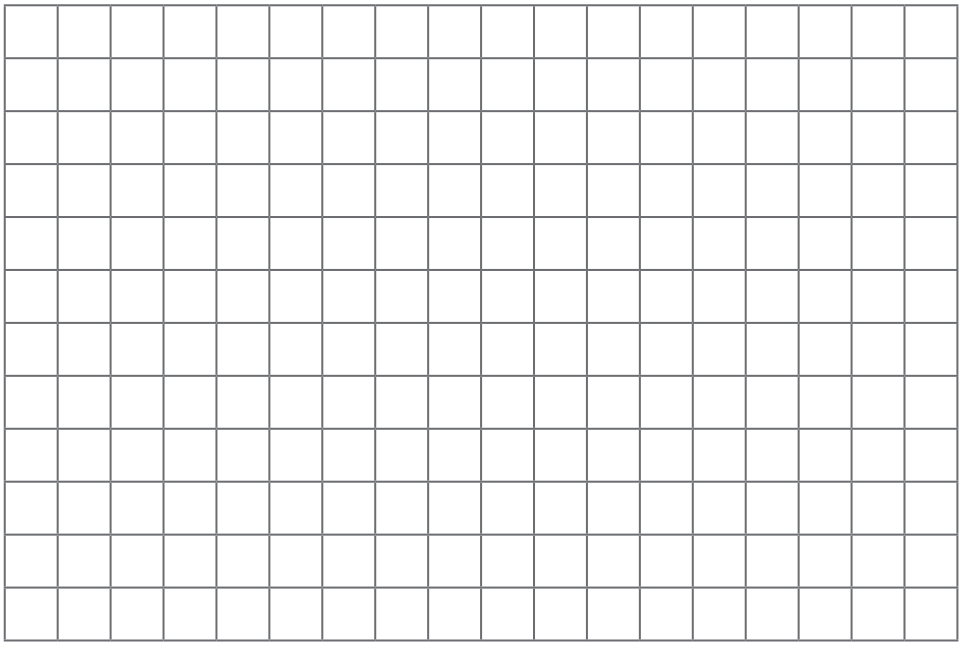
Plot the points on a coordinate plane.

14. *A* (7, 5), *B* (1, 6), *C* (4, 3), and *D* (8, 2)



15. *P* (2, 6), *Q* (4, 8), *R* (1, 5), and *S* (3, 7)



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Complete the table. Then use the table to answer the questions.

Example

Sophia made p necklaces for a charity sale. Nicole made 3 more necklaces than Sophia.

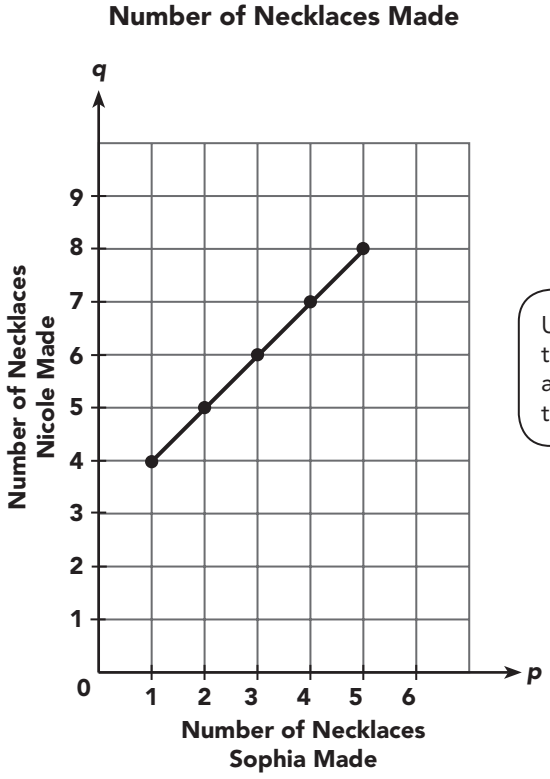
a) If Nicole made q necklaces, write an equation relating p and q.

$q = p + 3$

b) Complete the table to represent the linear equation.

Number of Necklaces Sophia Made (p)	1	2	3	4	5
Number of Necklaces Nicole Made (q)	4	5	6	7	8

c) Use the data from **b)** to plot the points on a coordinate plane. Connect the points with a line.



Name: _____ Date: _____

16. Mandy spends *a* dollars during lunchtime. Jason spends $4 more than Mandy.

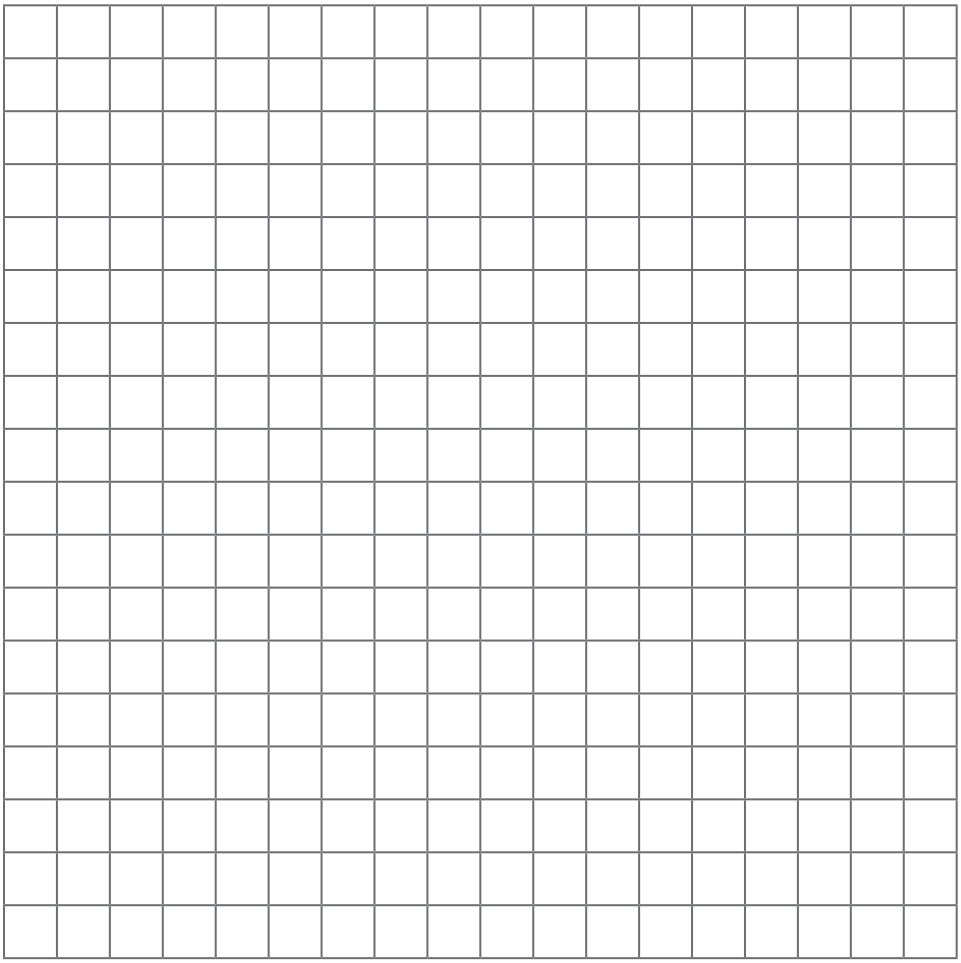
a) If Jason spends *b* dollars, write an equation relating *a* and *b*.

_____

b) Complete the table to represent the linear equation.

Amount of Money Mandy Spends (*a* dollars)	1	2	3	4	5
Amount of Money Jason Spends (*b* dollars)	5				

c) Use the data from **b)** to plot the points on a coordinate plane. Connect the points with a line.



Name: _____ Date: _____

17. Adrian has *h* game cards. Ben has 2 fewer game cards than Adrian.

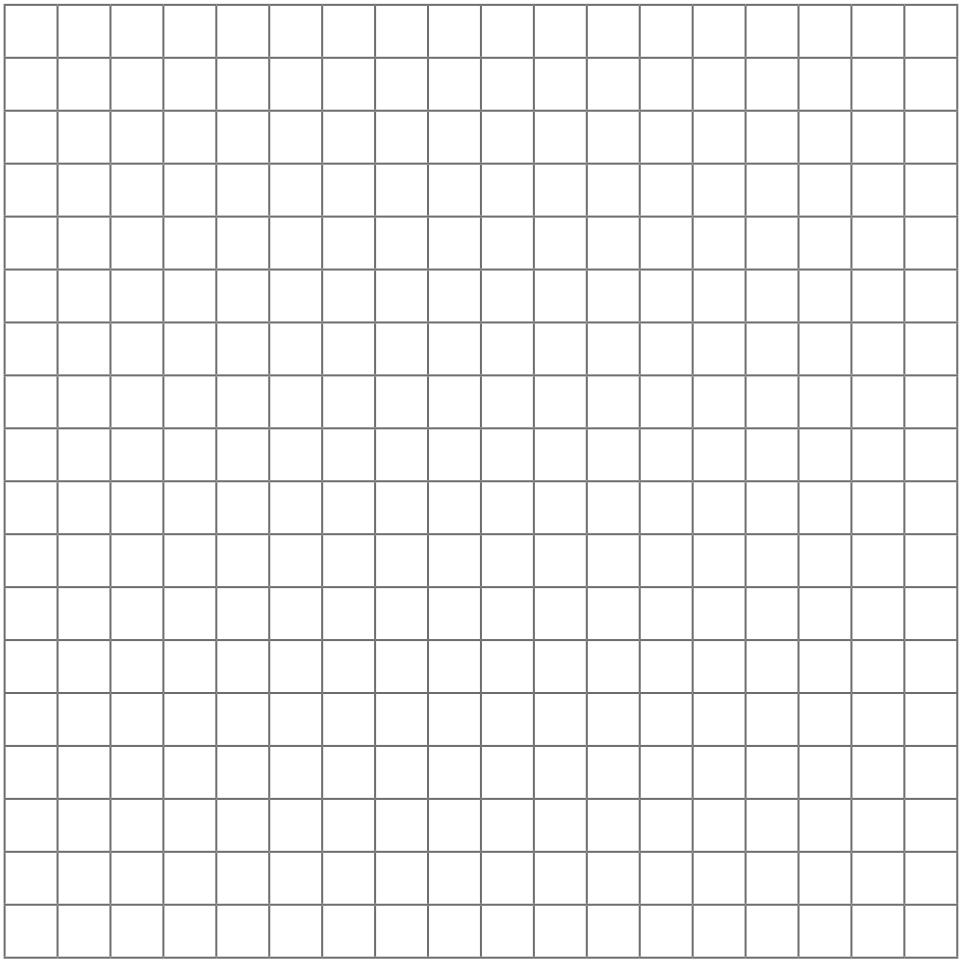
a) If Ben has *p* game cards, write an equation relating *p* and *h*.

_____

b) Complete the table to represent the linear equation.

Number of Adrian's Game Cards (*h*)	2	4	6	8	10
Number of Ben's Game Cards (*p*)					

c) Use the data from **b)** to plot the points on a coordinate plane. Connect the points with a line.



Name: _____ Date: _____

18. A square has a side length of k inches.

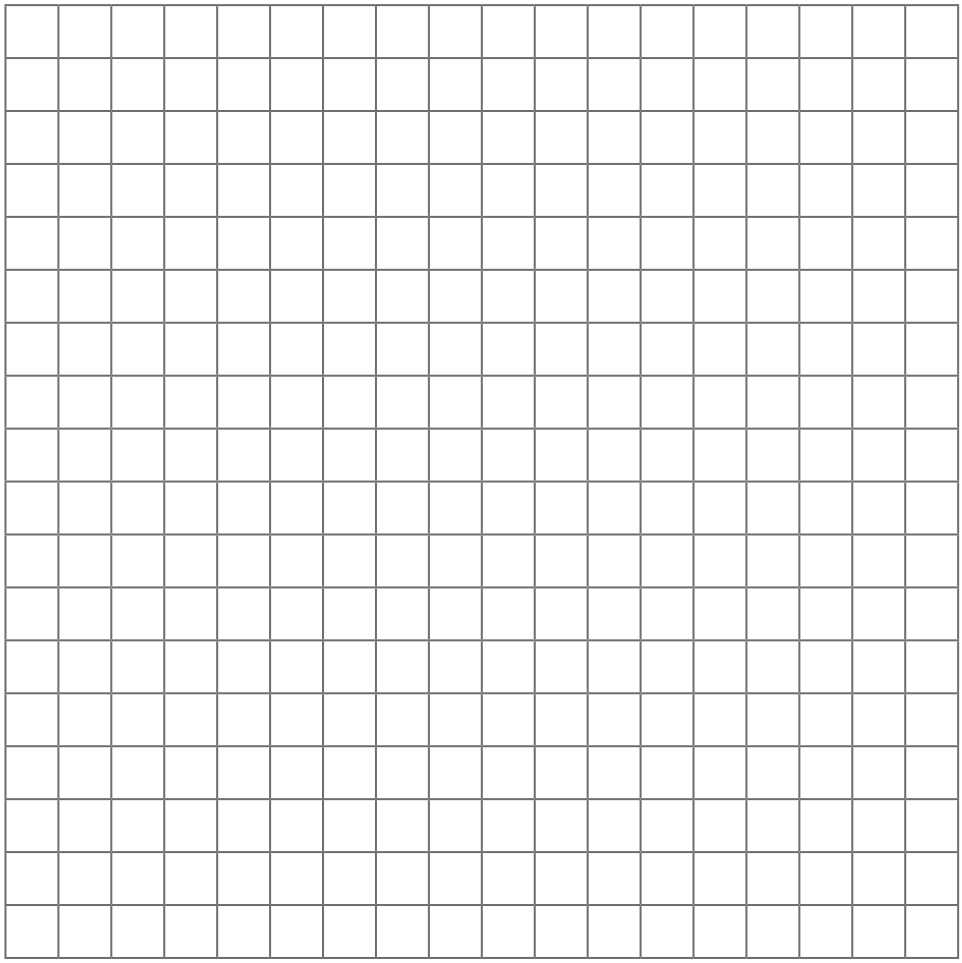
a) If the perimeter of the square is q inches, write an equation relating q and k.

_____

b) Complete the table to represent the linear equation.

Side Length of the Square (k inches)	1	2	3	4	5
Perimeter of the Square (q inches)					

c) Use the data from **b)** to plot the points on a coordinate plane. Connect the points with a line.



43. $b = 40$ **44.** $s = 63$

45. $x + \frac{3}{8} = \frac{7}{8}$

$x + \frac{3}{8} - \underline{\frac{3}{8}} = \frac{7}{8} - \underline{\frac{3}{8}}$

$x = \underline{\frac{4}{8}}$

$= \underline{\frac{1}{2}}$

$x = \underline{\frac{1}{2}}$ is the solution of the equation $x + \frac{3}{8} = \frac{7}{8}$.

46. $e + \frac{2}{10} = \frac{7}{10}$

$e + \frac{2}{10} \ominus \underline{\frac{2}{10}} = \frac{7}{10} \ominus \underline{\frac{2}{10}}$

$e = \underline{\frac{5}{10}}$

$= \underline{\frac{1}{2}}$

$e = \underline{\frac{1}{2}}$ is the solution of the equation $e + \frac{2}{10} = \frac{7}{10}$.

47. $k = \frac{1}{3}$ **48.** $p = \frac{3}{4}$

49. $g - \frac{1}{6} = \frac{1}{6}$

$g - \frac{1}{6} + \underline{\frac{1}{6}} = \frac{1}{6} + \underline{\frac{1}{6}}$

$g = \underline{\frac{2}{6}}$

$= \underline{\frac{1}{3}}$

$g = \underline{\frac{1}{3}}$ is the solution of the equation $g - \frac{1}{6} = \frac{1}{6}$.

50. $d - \frac{7}{15} = \frac{2}{15}$

$d - \frac{7}{15} \oplus \underline{\frac{7}{15}} = \frac{2}{15} \oplus \underline{\frac{7}{15}}$

$d = \underline{\frac{9}{15}}$

$= \underline{\frac{3}{5}}$

$d = \underline{\frac{3}{5}}$ is the solution of the equation $d - \frac{7}{15} = \frac{2}{15}$.

51. $w = \underline{\frac{3}{4}}$ **52.** $n = \underline{\frac{4}{5}}$

53. $7x = \frac{4}{7}$

$7x \div \underline{7} = \frac{4}{7} \div \underline{7}$

$x = \frac{4}{7} \cdot \underline{\frac{1}{7}}$

$= \underline{\frac{4}{49}}$

$x = \underline{\frac{4}{49}}$ is the solution of the equation $7x = \frac{4}{7}$.

54. $9m = \frac{5}{6}$

$9m \oslash \underline{9} = \frac{5}{6} \oslash \underline{9}$

$m = \frac{5}{6} \odot \underline{\frac{1}{9}}$

$= \underline{\frac{5}{54}}$

$m = \underline{\frac{5}{54}}$ is the solution of the equation $9m = \frac{5}{6}$.

55. $b = \frac{2}{21}$ **56.** $s = \frac{2}{9}$

57. $y = \frac{1}{12}$ **58.** $x = \frac{2}{15}$

59. $y = \frac{3}{28}$ **60.** $w = \frac{2}{11}$

Lesson 8.2

1. $6 + u$ **2.** $9 - w$

3. $\frac{z}{8}$ **4.** $10s$

5. a) $x - 10$

b) $y = x - 10$

c) Independent: x
Dependent: y

6. a) $g + 6$

b) $h = g + 6$

c) Independent: g
Dependent: h

7. a) $(t + 35)$ dollars

b) $u = t + 35$

c) Independent: t
Dependent: u

8. a) $g - 8$

b) $v = g - 8$

c) Independent: g
Dependent: v

9. a) $4 \cdot d = 4d$

b) $g = 4d$

c) Independent: d
Dependent: g

10. a) $m \div 10 = \frac{m}{10}$

b) $w = \frac{m}{10}$

c) Independent: m
Dependent: w

11. a) $3n$ years

b) $s = 3n$

c) Independent: n
Dependent: s

12. a) $b \div 5 = \frac{b}{5}$ dollars

b) $k = \frac{b}{5}$

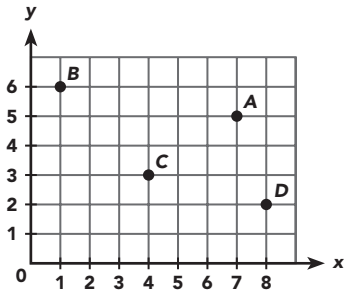
c) Independent: b
Dependent: k

13. **a)** $\frac{r}{2}$ meters

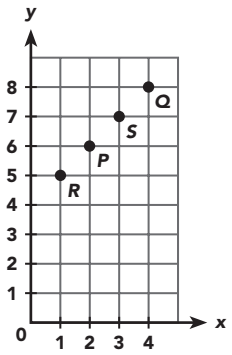
b) $t = \frac{r}{2}$

c) Independent: r
Dependent: t

14.



15.

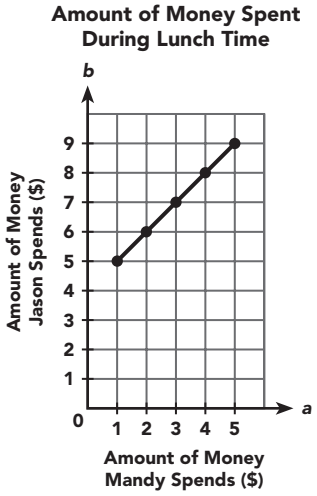


16. **a)** $b = a + 4$

b)

Amount of Money Mandy Spends (a dollars)	1	2	3	4	5
Amount of Money Jason Spends (b dollars)	5	6	7	8	9

c)



17. **a)** $p = h - 2$

b)

Number of Adrian's Game Cards (h)	2	4	6	8	10
Number of Ben's Game Cards (p)	0	2	4	6	8

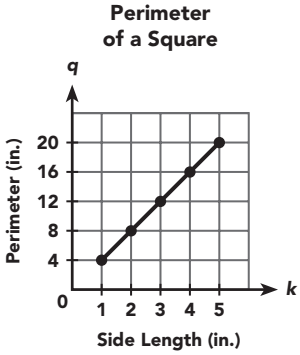
c)

18. **a)** $q = 4k$

b)

Side Length of the Square (k inches)	1	2	3	4	5
Perimeter of the Square (q inches)	4	8	12	16	20

c)



Lesson 8.3

1. $16 \boxed{>} -20$

2. $87 \boxed{>} 78$

3. $35 \cdot 6 \boxed{=} 6 \cdot 35$

4. $60 \div 20 \boxed{>} 20 \div 60$

5. $-5 \boxed{<} -1$

6. $-12 \boxed{<} 9$

7. Answers vary. Sample:

When g = 14, $g > 13$ is true.
When g = 15, $g > 13$ is true.
When g = 20, $g > 13$ is true.
When g = 78, $g > 13$ is true.

The inequality $g > 13$ is true for any value of g that is greater than 13.