NAME Answer Key DATE _____ PERIOD ____

3-3 D

Homework Practice

Solve Equations with Variables on Each Side

Answers will vary for #1-4

Express each equation as another equivalent equation. Justify your answer.

1. $8x + 3 = 5x - 18$

$-5x \quad -5x$

$3x + 3 = -18$

2. $-7 - x = -11 - 2x$

$+2x \quad +2x$

$-7 + x = -11$

3. $17 + 2x = 31 - 5x$

$+5x \quad +5x$

$17 + 7x = 31$

4. $6 - 3x = -18x$

$+3x \quad +3x$

$6 = -15x$

Solve each equation. Check your solution.

5. $2.3 - 5x = 3x - 5.7$

$+5.7 \quad +5.7$

$8 - 5x = 3x$

$+5x \quad +5x$

$8 = 8x$

$x = 1$

6. $\frac{x}{3} + 4 = 5 + \frac{x}{6}$

$2x + 24 = 30 + x$

$-x \quad -x$

$x + 24 = 30$

$-24 \quad -24$

$x = 6$

7. $-9 + x = \frac{8x}{8} - 23$

$-72 + 8x = x - 184$

$-x \quad -x$

$-72 + 7x = -184$

$+72 \quad +72$

$7x = -112$

$x = -16$

8. $-10 - 3x = 3x + 2$

$+3x \quad +3x$

$-10 = 6x + 2$

$-2 \quad -2$

$-12 = 6x$

$x = -2$

9. $\frac{1}{3}x - 6 = 9 + \frac{2}{3}x$

$x - 18 = 27 + 2x$

$-x \quad -x$

$-18 = 27 + x$

$-27 \quad -27$

$x = -45$

10. $-x + 11 = -2.4 + x$

$+x \quad +x$

$11 = -2.4 + 2x$

$+2.4 \quad +2.4$

$13.4 = 2x$

$x = 6.7$

11. $5x + 3 = 4x$

$-5x \quad -5x$

$3 = -x$

$x = -3$

12. $9 - 6x = 3x$

$+6x \quad +6x$

$9 = 9x$

$x = 1$

13. **MUGS** Manuela is having mugs made for a fundraiser. The Cup Company will make them for \$4 each plus a \$30 set-up charge. Mugs Are Us will make them for \$4.50 each with no set-up charge. Write and solve an equation to find how many mugs Manuela can have made for the two company prices to be the same.

$4x + 30 = 4.5x$

$-4x \quad -4x$

$30 = .5x$

$x = 150$ mugs.

Get Connected *For more examples, go to glencoe.com.*

NAME _____ DATE _____ PERIOD ____

3-3 D

Skills Practice

Solve Equations with Variables on Each Side

answers will vary for #1-4

Express each equation as another equivalent equation. Justify your answer.

1. $3x + 7 = 2x$

$-3x \quad -3x$

$7 = -x$

$\frac{7}{-1} = \frac{-x}{-1}$

$x = -7$

2. $4x + 6 = 6x$

$-4x \quad -4x$

$6 = 2x$

3. $7 + 5x = 2 + 6x$

$-5x \quad -5x$

$7 = 2 + x$

4. $-9 + x = -11 - x$

$+x \quad +x$

$-9 + 2x = -11$

Solve each equation. Check your solution.

5. $6x - 15 = 65 + x$

$-x \quad -x$

$5x - 15 = 65$

$+15 \quad +15$

$\frac{5x}{5} = \frac{80}{5}$

$x = 16$

6. $\frac{x}{2} - 12 = -3 + x$

$2\left(\frac{x}{2} - 12 = -3 + x\right)$

$x - 24 = -6 + 2x$

$-x \quad -x$

$-24 = -6 + x$

$+6 \quad +6$

$x = -18$

7. $13x + 8 = 65 + 10x$

$-10x \quad -10x$

$3x + 8 = 65$

$-8 \quad -8$

$\frac{3x}{3} = \frac{57}{3}$

$x = 19$

8. $4x - 31 = 11 - 2x$

$+2x \quad +2x$

$2x - 31 = 11$

$+31 \quad +31$

$\frac{2x}{2} = \frac{42}{2}$

$x = 21$

9. $26 - 2x = 2x + 2$

$+2x \quad +2x$

$26 = 4x + 2$

$-2 \quad -2$

$\frac{24}{4} = \frac{4x}{4}$

$x = 6$

10. $8 - x = x + 36$

$+x \quad +x$

$8 = 2x + 36$

$-36 \quad -36$

$\frac{-28}{2} = \frac{2x}{2}$

$x = -14$

11. $\frac{x}{4} - 3 = x + 8$

$4\left(\frac{x}{4} - 3 = x + 8\right)$

$x - 12 = 4x + 32$

$-x \quad -x$

$-12 = 3x + 32$

$-32 \quad -32$

$\frac{-44}{3} = \frac{3x}{3}$

$x = -\frac{44}{3}$ or $-14\frac{2}{3}$

12. $9x - 4 = 32 + 5x$

$-5x \quad -5x$

$4x - 4 = 32$

$+4 \quad +4$

$\frac{4x}{4} = \frac{36}{4}$

$x = 9$

Name _____ Date _____ Class _____

LESSON 15-3

Equations with the Distributive Property

Practice and Problem Solving: D

Solve each equation. The first one has been done for you.

1. $2(x - 5) = 10$

   $x = 10$

2. $3(n - 6) = 27$

   $n = 15$

3. $9(4 - s) = 10 + 4s$

   $s = 2$

4. $8(2 - p) = 24p$

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

5. $-2(y - 3) = y + 24$

   $y = -6$

6. $8(8 - k) = -72k$

   $k = -1$

7. $-3(12 - m) = -1(m - 8)$

   $m = 11$

8. $10(2 + x) = 15(x - 1) + 5$

   $x = 6$

Answer each question to solve the problem. The first one is done for you.

9. Kevan is 6 years younger than his sister Katie. Melanie is twice as old as Kevan. How old are all three siblings?

   a. If you let k represent Katie's current age, what expression can you use to represent Kevan's current age?

   $k - 6$

   b. Based on your answer to part a, what expression represents Melanie's age?

   $2(k - 6)$

   c. If Melanie is 18 years old, what equation can you write to solve the problem?

   $18 = 2(k - 6)$

   d. Solve the equation. How old are Kevan and Katie?

   Katie is 15 yo, Kevan is 9 yo.

Name _____ Date _____ Class _____

LESSON 15-3

Equations with the Distributive Property

Practice and Problem Solving: A/B

Solve each equation.

1. $4(x - 2) = x + 10$

$x = 6$

2. $\frac{2}{3}(n - 6) = 5n - 43$

$n = 9$

3. $-2(y + 12) = y - 9$

$y = -15$

4. $8(12 - k) = 3(k + 21)$

$k = 3$

5. $8(-1 + m) + 3 = 2\left(m - 5\frac{1}{2}\right)$

$m = -1$

6. $2y - 3(2y - 3) + 2 = 31$

$y = -5$

Use the situation below to complete Exercises 7–8.

A taxi company charges \$2.25 for the first mile and then \$0.20 per mile for each additional mile, or $F = \$2.25 + \$0.20(m - 1)$ where F is the fare and m is the number of miles.

7. If Juan's taxi fare was \$6.05, how many miles did he travel in the taxi?

$y = 20$ miles

8. If Juan's taxi fare was \$7.65, how many miles did he travel in the taxi?

28 miles

Use the situation below to complete Exercises 9–11.

The equation used to estimate typing speed is $S = \frac{1}{5}(w - 10e)$, where S is the accurate typing speed, w is the number of words typed in 5 minutes and e is the number of errors.

9. Ignacio can type 55 words per minute (wpm). In 5 minutes, she types 285 words. How many errors would you expect her to make?

1 error

10. If Alexis types 300 words in 5 minutes with 5 errors, what is his typing speed?

50 wpm

11. Johanna receives a report that says her typing speed is 65 words per minute. She knows that she made 4 errors in the 5-minute test. How many words did she type in 5 minutes?

345 words

Name _____ Date _____ Class _____

LESSON 15-2

Equations with Rational Numbers

Practice and Problem Solving: A/B

Write the least common multiple of the denominators in the equation.

1. $9 + \frac{3}{4}x = \frac{7}{8}x - 10$ 8

2. $\frac{2}{3}x + \frac{1}{6} = -\frac{3}{4}x + 1$ 12

Describe the operations used to solve the equation.

3. $\frac{5}{6}x - 2 = -\frac{2}{3}x + 1$

$6\left(\frac{5}{6}x - 2\right) = 6\left(-\frac{2}{3}x + 1\right)$ multiply by 6

$5x - 12 = -4x + 6$ distribute

$+4x \quad +4x$ add 4 to both sides

$9x - 12 = 6$ simplify

$+12 \quad +12$ add 12 to both sides

$9x = 18$ simplify

$\frac{9x}{9} = \frac{18}{9}$ divide by 9 on both sides

$x = 2$

Solve.

4. $\frac{2}{3}x + \frac{1}{3} = \frac{1}{3}x + \frac{2}{3}$ $x = 1$

5. $\frac{3}{5}n + \frac{9}{10} = -\frac{1}{5}n - \frac{23}{10}$ $n = -4$

6. $\frac{5}{6}h - \frac{7}{12} = -\frac{3}{4}h - \frac{13}{6}$ $h = -16$

7. $4.5w = 5.1w - 30$ $w = 50$

8. $\frac{4}{7}y - 2 = \frac{3}{7}y + \frac{3}{14}$ $y = \frac{27}{2}$

9. $-0.8a - 8 = 0.2a$ $-8 = a$

10. Write and solve a real-world problem that can be modeled by the equation $0.75x - 18.50 = 0.65x$.

answers will vary.

Name _____ Date _____ Class _____

LESSON 15-1

Equations with the Variable on Both Sides

Practice and Problem Solving: A/B

Use algebra tiles to model and solve each equation.

1. $x + 3 = -x - 5$

$+x \quad +x$

$2x + 3 = -5$

$-3 \quad -3$

$\frac{2x}{2} = \frac{-8}{2}$

$x = -4$

2. $1 - 2x = -x - 3$

$+2x \quad +2x$

$1 = x - 3$

$+3 \quad +3$

$x = 4$

3. $x - 2 = -3x + 2$

$+3x \quad +3x$

$4x - 2 = 2$

$+2 \quad +2$

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

$x = 1$

Fill in the boxes to solve each equation.

4. $4a - 3 = 2a + 7$

$-2a \quad -[2a]$

$2a - 3 = 7$

$+[3] \quad +3$

$2a = [10]$

$\frac{2a}{[2]} = \frac{10}{[2]}$

$a = [5]$

5. $7x - 1 = 2x + 5$

$-[2x] \quad -2x$

$5x - 1 = [5]$

$+[1] \quad +1$

$5x = [6]$

$\frac{5x}{[5]} = \frac{6}{[5]}$

$x = \left[\frac{6}{5}\right]$

6. $-3r + 9 = -4r + 5$

$+[4r] \quad +4r$

$r + 9 = 5$

$-[9] \quad -9$

$r = [-4]$

Solve.

7. $3y + 1 = 4y - 6$

$-3y \quad -3y$

$1 = y - 6$

$+6 \quad +6$

$y = 7$

8. $2 + 6x = 1 - x$

$+x \quad +x$

$2 + 7x = 1$

$-2 \quad -2$

$\frac{7x}{7} = \frac{-1}{7}$

$x = -\frac{1}{7}$

9. $5y + 4 = 4y + 5$

$-4y \quad -4y$

$y + 4 = 5$

$-4 \quad -4$

$y = 1$

Write an equation to represent each relationship. Then solve the equation.

10. Ten less than 3 times a number is the same as the number plus 4.

$3x - 10 = x + 4$; 7

11. Six times a number plus 4 is the same as the number minus 11.

$6x + 4 = x - 1$; -1

12. Fifteen more than twice the hours Carla worked last week is the same as three times the hours she worked this week decreased by 15. She worked the same number of hours each week. How many hours did she work each week?

$2h + 15 = 3h - 15$

$-2h \quad -2h$

$15 = h - 15$

$+15 \quad +15$

$h = 30$

$6x + 4 = x - 1$

$-x \quad -x$

$5x + 4 = -1$

$-4 \quad -4$

$\frac{5x}{5} = \frac{-5}{5}$

$x = -1$

$3x - 10 = x + 4$

$-x \quad -x$

$2x - 10 = 4$

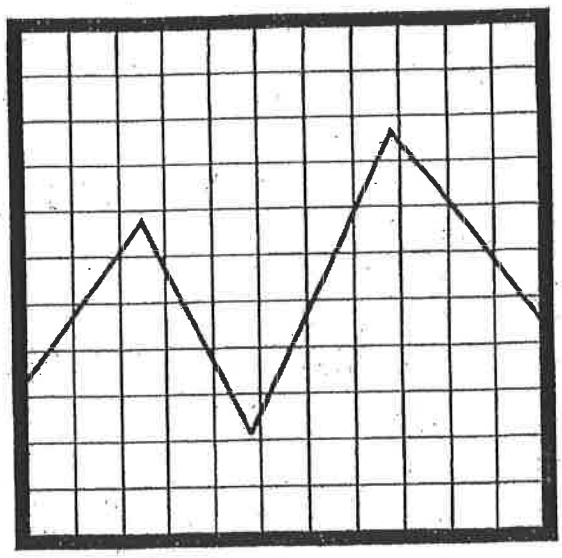
$+10 \quad +10$

$\frac{2x}{2} = \frac{14}{2}$

$x = 7$

What Is the Title of This Picture?

Find each solution in the coded title. Each time it appears, write the letter of the exercise above it.



CODED TITLE:

M	O	U	N	T	A	I	N	_	R	A	N	G	E
0	−7	−6	9	58	3	−2	9	13	−5	3	9	−8	27
V	I	E	W	E	D	_	T	H	R	O	U	G	H
−21	−2	27	10	27	4	51	58	−11	−5	−7	−6	−8	−11
T	E	N	N	I	S	_	R	A	C	K	E	T	
58	27	9	9	−2	5	−17	−5	3	7	−1	27	58	

S $7n + 2 = 4n + 17$

$-4n \quad -4n$

$3n + 2 = 17$

$-2 \quad -2$

$3n = 15$

$n = 5$

A $8y - 3 = 15 + 2y$

$-2y \quad -2y$

$6y - 3 = 15$

$+3 \quad +3$

$6y = 18$

$y = 3$

G $5x + 9 = x - 23$

$-x \quad -x$

$4x + 9 = -23$

$-9 \quad -9$

$4x = -32$

$x = -8$

D $-2k + 19 = 3k - 1$

$+2k \quad +2k$

$19 = 5k - 1$

$+1 \quad +1$

$20 = 5k$

$k = 4$

I $7 - 6u = 5u + 29$

$+6u \quad +6u$

$7 = 11u + 29$

$-29 \quad -29$

$-22 = 11u$

$u = -2$

O $9m = 4m - 35$

$-4m \quad -4m$

$5m = -35$

$m = -7$

C $5(x + 2) = 3(x + 8)$

$5x + 10 = 3x + 24$

$-3x \quad -3x$

$2x + 10 = 24$

$-10 \quad -10$

$2x = 14$

$x = 7$

W $6(t - 1) = 9(t - 4)$

$6t - 6 = 9t - 36$

$-6t \quad -6t$

$-6 = 3t - 36$

$30 = 3t$

U $q + 14 = 8(q + 7)$

$q + 14 = 8q + 56$

$-q \quad -q$

$14 = 7q + 56$

$-56 \quad -56$

$-42 = 7q$

$q = -6$

H $10 - d = -34 - 5d$

$+5d \quad +5d$

$10 + 4d = -34$

$-10 \quad -10$

$4d = -44$

$d = -11$

V $8v + 1 = 7v - 20$

$-7v \quad -7v$

$v + 1 = -20$

$-1 \quad -1$

$v = -21$

E $4(w - 6) = 3(w + 1)$

$4w - 24 = 3w + 3$

$-3w \quad -3w$

$w - 24 = 3$

$+24 \quad +24$

$w = 27$

K $11p + 16 = 2p + 7$

$-2p \quad -2p$

$9p + 16 = 7$

$-16 \quad -16$

$9p = -9$

$p = -1$

M $10b - 45 = 3(b - 15)$

$10b - 45 = 3b - 45$

$-3b \quad -3b$

$7b - 45 = -45$

$+45 \quad +45$

$7b = 0$

$b = 0$

T $12(y + 5) = 13y + 2$

$12y + 60 = 13y + 2$

$-12y \quad -12y$

$60 = y + 2$

$-2 \quad -2$

$y = 58$

R Nine more than four times a number is the same as one less than twice the number. Find the number.

$4n + 9 = 2n - 1$

$-2n \quad -2n$

$2n + 9 = -1$

$-9 \quad -9$

$2n = -10$

$n = -5$

N Eighty, decreased by three times a number, is the same as five times the number, increased by eight. Find the number.

$80 - 3n = 5n + 8$

$+3n \quad +3n$

$80 = 8n + 8$

$-8 \quad -8$

$72 = 8n$

$n = 9$