

LESSON
6-2**One-Step Equations with Rational Coefficients****Using Addition to Undo Subtraction**

Addition “undoes” subtraction. Adding the same number to both sides of an equation keeps the equation balanced.

$$\begin{aligned}x - 5 &= -6.3 \\x - 5 + 5 &= -6.3 + 5 \\x &= -1.3\end{aligned}$$

Using Subtraction to Undo Addition

Subtraction “undoes” addition. Subtracting a number from both sides of an equation keeps the equation balanced.

$$\begin{aligned}n + \frac{3}{4} &= -15 \\n + \frac{3}{4} - \frac{3}{4} &= -15 - \frac{3}{4} \\n &= -15\frac{3}{4}\end{aligned}$$

Be careful to identify the correct number that is to be added or subtracted from both sides of an equation. The numbers and variables can move around, as the problems show.

Solve using addition or subtraction.

1. $6 = m - \frac{7}{8}$

2. $3.9 + t = 4.5$

3. $10 = -3.1 + j$

Multiplication Undoes Division

To “undo” division, multiply both sides of an equation by the number in the denominator of a problem like this one.

$$\begin{aligned}\frac{m}{3} &= 6 \\3 \times \frac{m}{3} &= 3 \times 6 \\m &= 18\end{aligned}$$

Division Undoes Multiplication

To “undo” multiplication, divide both sides of an equation by the number that is multiplied by the variable as shown in this problem.

$$\begin{aligned}4.5p &= 18 \\ \frac{4.5p}{4.5} &= \frac{18}{4.5} = 4\end{aligned}$$

Notice that decimals and fractions can be handled this way, too.

Solve using division or multiplication.

4. $\frac{y}{2.4} = 5$

5. $0.35w = -7$

6. $-\frac{a}{6} = 1$

b. $4(5d + 3c)$; Answers will vary.

Sample answer: The factor $5d + 3c$ shows that for every 5 drills purchased, 3 chargers were purchased.

c. The un-factored expression, $20d + 12c$, gives the total amount paid for both drills and chargers. The factored form of $20d + 12c$ which is $4(5d + 3c)$ gives a quick way to see how many chargers (3) are sold when a certain number of drills (5) are sold.

Success for English Learners

1. $10 + 3n$

2. Three times the price of a pizza and two drinks shows factoring, since it can be represented as the product of two factors—3 and $p + 2d$. Sample answers: $3p + 6d$; $3(p + 2d)$

3. $3(p + 2d) = 3p + 6d$

LESSON 6-2

Practice and Problem Solving: A/B

1. $n = 13\frac{1}{3}$

2. $y = 1.6$

3. $a = 24$

4. $v = -3$

5. $\frac{15.5z}{15.5} = \frac{-77.5}{15.5}$; $z = -5$

6. $-11\left(\frac{t}{-11}\right) = -11(11)$; $t = -121$

7. $\frac{0.5m}{0.5} = \frac{0.75}{0.5}$; $m = 1.5$

8. $4\left(\frac{r}{4}\right) = 4(250)$; $r = 1,000$

9. $\frac{1}{3}n - 8 = -13$

10. $-12.3f = -73.8$

11. $10 = T + 12$; $T = -1^\circ\text{C}$

12. $3.2d = 48$; $d = 15$ days

13. $15t = 193.75$; $t = \$12.92$ (to the nearest cent)

14. $\frac{1}{3}d = \frac{1}{4}$; $d = \frac{3}{4}$ mi

Practice and Problem Solving: C

1. $x = 5\frac{1}{3}$

2. $m = 7.1$

3. $y = 2.76$

4. $z = 2.76$

5. $s = 5\frac{4}{7}$

6. $r = 5\frac{13}{25}$

7. $f = 2\frac{1}{4}$

8. $m = 1\frac{5}{9}$

9. a. $5h = 37.5$, $h = 7.5$; She worked 7.5 h on average per day.

b. \$118.125; She made \$118.13 per day.

10. $3\frac{2}{3} \cdot x = 7\frac{1}{3}$; $x = 2$; He doubled the recipe.

11. $3\frac{2}{3} + 3\frac{2}{3} = 6\frac{4}{3} = 7\frac{1}{3}$, addition;

$3\frac{2}{3} \cdot 2 = 6\frac{4}{3} = 7\frac{1}{3}$; multiplication

12. $1.89x \approx 6$; $x \approx 3$; She bought 3 bottles.

13. $38.4 \text{ in} = 3.2 \text{ ft}$; $15.3 - x = 3.2$, $x = 12.1$; The piece he cut was 12.1 feet long.

Practice and Problem Solving: D

1. 8; 8; 19

2. 3; 3; 1

3. 5; 5; 3

4. 7; 7; -21

5. $3 \times \frac{a}{3} = 3 \times 5$; 15

6. 4.5; 4.5; 6

7. 5; 5; 30

8. 7.35; 7.35; 4

9. 110° ; x ; 180° ; $110 + x = 180$; $x = 70^\circ$

10. miles; gallon; 72.9, 2.7, 27; 27

Reteach

1. $m = 6\frac{7}{8}$

2. $t = -0.6$

3. $j = 13.1$
4. $y = 12$
5. $w = -20$
6. $a = -6$

Reading Strategies

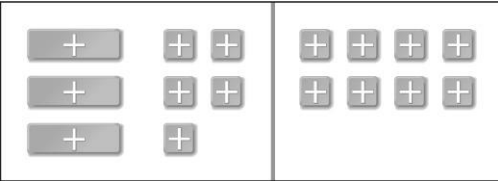
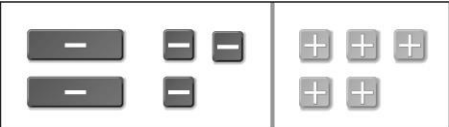
1. $8 \times \frac{p}{8} = -2 \times 8; -16$
2. $1.5 - 1.5 + q = -0.6 - 1.5; -2.1$
3. $\frac{-9.5a}{-9.5} = \frac{-38}{-9.5}; 4$
4. $14v = 269.50; \frac{14v}{14} = \frac{269.50}{14}; v = \19.25
5. $\frac{3}{4}g = 18; \frac{4}{3} \times \frac{3}{4}g = \frac{4}{3} \times 18; g = 24$
games

Success for English Learners

1. The "7.2" has to be written as "7.20" so it will have the same number of decimal places as "3.84."
2. $\frac{a}{-3}$ can be written as $-\frac{1}{3}a$, so $-\frac{1}{3}$ is a rational number coefficient.
3. $\frac{1}{4}x$ could be written as $\frac{x}{4}$ or as $0.25x$.

LESSON 6-3

Practice and Problem Solving: A/B

1. 
2. 



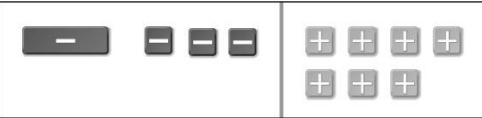
3. $6t + 15 = 81$
4. $40 + 55h = 190$
5. $1.75 + 0.75m = 4.75$

Practice and Problem Solving: C

1. $\frac{p+7}{12} = 3$
2. $\frac{16}{q+1} = 4$

3. $\frac{7-s}{3} = 2$
4. $12.3 + 5.013d = 15.302$
5. $\frac{z+22}{z} = 12$
6. $75 + 255c = 1,605$

Practice and Problem Solving: D

1. 
2. 
3. 

4. $3d + 5 = 17$
5. $40 + 25m = 240$
6. $10 + 7r = 45$

Reteach

1. $21 + 5f = 61$
2. $7j + 17 = 87$
3. $18 + 0.05n = 50.50$
4. $40 + 30s = 220$

Reading Strategies

1. Equation: $50 - 5n = 15$
Number of steps and description:
Two steps: Multiply a number n by 5, and subtract the result from 50.
2. Equation: $m + 8 = 27$
Number of steps and description:
One step: Add 8 to a number m .
3. Equation: $4b + 3 = 23$
Number of steps and description:
Two steps: Multiply a number b by 4, then add 3.
4. Equation: $15f = 90$
Number of steps and description:
One step: Multiply a number f by 15.