

Exercise - Writing Equations

1

Eighteen more than the number n is 125.
What is the value of n ?

2

Twenty is 7 less than twice the number w .
What is the value of w ?

3

Nine less than twice x is three more than x .
What is the value of x ?

4

Eight less than four times the number c is twenty.
What is the value of c ?

5

The sum of four consecutive odd integers is 296.
What is the greatest of the four consecutive odd integers?

6

The sum of three fourths of the number a and 24 is negative 9. What is the value of a ?

- A) -44
- B) -20
- C) 20
- D) 44

7

A number g is decreased by 23 and then multiplied by $\frac{1}{2}$. The result is 8 more than twice the number g .

- A) -13
- B) $-\frac{34}{3}$
- C) $-\frac{29}{3}$
- D) -8

8

The quotient of p and q is twelve less than three times the sum of p and q .

Which of the following equations represents the statement above?

- A) $\frac{p}{q} = (3p + q) - 12$
- B) $\frac{p}{q} = 12 - (3p + q)$
- C) $\frac{p}{q} = 3(p + q) - 12$
- D) $\frac{p}{q} = 12 - 3(p + q)$

Exercise - Solving Equations

1

$$-11 + x = 9$$

Given the above equation, what is the value of $20 - (11 - x)$?

2

If $33 - a = a + 27 - 5a$, what is the value of $33 + 3a$?

3

If $\frac{1}{2}x + 3 = \frac{3}{4} - x$, what is the value of x ?

4

If $x - (3 - 2x) + (4 - 5x) = -7$, what is the value of x ?

5

If three quarters of a number decreased by twenty is equal to eighty two, what is that number?

6

Two and three fifths of a number equals -26 . What is the number?

- A) -15
- B) -10
- C) -5
- D) 10

7

There are one hundred forty-two students in a high school band. These students represent two ninth of the total students in the high school. How many students attend the school?

- A) 587
- B) 613
- C) 639
- D) 665

8

$$820c + 380r = 4,360$$

The above equation models the amount of calories in a snack of c cups of cashews and r cups of raisins. The amount of calories per cup of cashews is 820 and the amount of calories per cup of raisins is 380. According to the equation, how many cups of raisins are used, if 3 cups of cashews are used to make the snack?

- A) 3
- B) 4
- C) 5
- D) 6

Exercise - Solving Equations with Variables on Both Sides

1

If $7n + 3 = 2n - 12$, what is the value of $-n + 3$?

2

If $7(h - 5) - 3h = \frac{3}{2}h$, what is the value of $\frac{1}{7}h$?

3

$$\frac{r}{3} + \frac{s}{11} = \frac{39}{33}$$

Given the above equation, if $s = 2$, what is the value of r ?

4

If $\frac{9 - 2k}{3} = k - 2$, what is the value of k ?

5

A \$48 shirts costs \$22 more than one half the cost of a pair of pants. How much does the pair of pants cost?

6

Twice a number n , increased by 11 is the same as six times the number decreased by 9. What is the value of n ?

7

One half of a number increased by 3 is five less than two thirds of the number.

8

Four times the greatest of three consecutive odd integers exceeds three times the least by 31. What is the greatest of the three consecutive odd integers?

Exercise - Equation with No Solution and Identity

1

If $\frac{1}{3}(9-6x) = 5-2x$, what is the value of x ?

- A) 3
- B) 4
- C) 5
- D) The equation has no solution.

2

If $5(x-2)-3x = 2(x-5)$, which of the following must be true?

- A) x is 3.
- B) x is 4.
- C) x is 5.
- D) The equation is true for all values of x .

3

$$\frac{1}{3}(15-6x) = 5-ax$$

If the linear equation above is an identity, what is the value of a ?

- A) 2
- B) 3
- C) 4
- D) 5

4

$$4x+13 = 7(x-2)+bx$$

If the linear equation above has no solution, which of the following could be the value of b ?

- A) -1
- B) -2
- C) -3
- D) -4

5

What is the value of n

if $-\frac{7}{2}(2n-3)+4n = \frac{3}{2}(5+2n)$?

6

What is the value of k

if $\frac{13-7(k+1)}{3} = 3k-2$?

7

What is the value of x

if $-2[3-(x-4)]+5x = 2-x$?

8

What is the value of m

if $0.4(5m-9) = -5m-4(0.3-m)$?

Exercise - Solving for a Specific Variable

1

If $2x + 3y = 18$, which of the following gives y in terms of x ?

A) $y = 6 + \frac{2}{3}x$

B) $y = 6 - \frac{2}{3}x$

C) $y = 6 + \frac{3}{2}x$

D) $y = 6 - \frac{3}{2}x$

2

If $P = 2l + 2w$, which of the following gives w in terms of P and l ?

A) $w = P - 2l$

B) $w = P - l$

C) $w = \frac{P}{2} - l$

D) $w = P - \frac{l}{2}$

3

If $c = \frac{a}{a+b}$, which of the following gives a in terms of b and c ?

A) $a = \frac{bc}{1-c}$

B) $a = \frac{bc}{1+c}$

C) $a = \frac{bc}{b-c}$

D) $a = \frac{bc}{b+c}$

4

If $\frac{ab-1}{3} = c$, which of the following gives b in terms of the other variables?

A) $b = \frac{3c+1}{a}$

B) $b = \frac{3c-1}{a}$

C) $b = \frac{3c}{a} + 1$

D) $b = \frac{3c}{a} - 1$

5

If $gh - f = g - h$, which of the following gives g in terms of the other variables?

A) $g = \frac{f+h}{h-1}$

B) $g = \frac{f-h}{h+1}$

C) $g = \frac{f+h}{h+1}$

D) $g = \frac{f-h}{h-1}$

6

If $n = a + (k-1)d$, which of the following gives k in terms of the other variables?

A) $k = \frac{n-a+1}{d}$

B) $k = \frac{n+a-1}{d}$

C) $k = \frac{n-a-d}{d}$

D) $k = \frac{n-a+d}{d}$

Answer Key

Section 2-1

1. 107 2. 13.5 3. 12 4. 7 5. 77
6. A 7. A 8. C

Section 2-2

1. 29 2. 27 3. $\frac{5}{2}$ 4. 4 5. 136
6. B 7. C 8. C

Section 2-3

1. 6 2. 2 3. 3 4. 3 5. 52
6. 5 7. 48 8. 19

Section 2-4

1. D 2. D 3. A 4. C 5. $\frac{1}{2}$
6. $\frac{3}{4}$ 7. 2 8. 0.8

Section 2-5

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

Chapter 2 Practice Test

1. C 2. B 3. C 4. D 5. C
6. A 7. B 8. D 9. 0 10. 1.43
11. 3

Answers and Explanations

Section 2-1

1. 107

$$\underbrace{n+18}_{18 \text{ more than } n} = 125$$

$$n = 125 - 18 = 107$$

2. 13.5

$$20 = \underbrace{2w-7}_{7 \text{ less than twice } w}$$

$$20 + 7 = 2w - 7 + 7 \quad \text{Add 7 to each side.}$$

$$27 = 2w \quad \text{Simplify.}$$

$$\frac{27}{2} = \frac{2w}{2} \quad \text{Divide each side by 2.}$$

$$13.5 = w \quad \text{Simplify.}$$

3. 12

$$\underbrace{2x-9}_{9 \text{ less than twice } x} = \underbrace{x+3}_{3 \text{ more than } x}$$

$$2x - 9 - x = x + 3 - x \quad \text{Subtract } x \text{ from each side.}$$

$$x - 9 = 3 \quad \text{Simplify.}$$

$$x = 12$$

4. 7

$$\underbrace{4c-8}_{8 \text{ less than 4 times } c} = 20$$

$$4c - 8 + 8 = 20 + 8 \quad \text{Add 8 to each side.}$$

$$4c = 28 \quad \text{Simplify.}$$

$$c = 7$$

5. 77

Let n = the smallest of four consecutive odd integers. Then,

$$n + (n + 2) + (n + 4) + (n + 6) = 296$$

$$4n + 12 = 296$$

$$4n = 284$$

$$n = 71$$

The greatest of the four consecutive odd integers is $n + 6$. Therefore,

$$n + 6 = 71 + 6 = 77$$

6. A

$$\underbrace{\frac{3}{4}a + 24}_{\text{the sum of three fourths of } a \text{ and } 24} = -9$$

$$\frac{3}{4}a + 24 - 24 = -9 - 24 \quad \text{Subtract 24 from each side.}$$

$$\frac{3}{4}a = -33 \quad \text{Simplify.}$$

$$\frac{4}{3} \cdot \frac{3}{4}a = \frac{4}{3}(-33) \quad \text{Multiply each side by } \frac{4}{3}.$$

$$a = -44$$

7. A

$$\underbrace{(g-23)\frac{1}{2}}_{g \text{ is decrease by 23 and then multiplied by } \frac{1}{2}} = \underbrace{2g+8}_{8 \text{ more than twice } g}$$

$$(g-23)\frac{1}{2} \cdot 2 = (2g+8)2 \quad \text{Multiply each side by 2.}$$

$$g - 23 = 4g + 16 \quad \text{Simplify.}$$

$$g - 23 + 23 = 4g + 16 + 23 \quad \text{Add 23 to each side.}$$

$$g = 4g + 39 \quad \text{Simplify.}$$

$$g - 4g = 4g + 39 - 4g \quad \text{Subtract } 4g.$$

$$-3g = 39 \quad \text{Simplify.}$$

$$g = -13$$

8. C

$$\underbrace{\frac{p}{q}}_{\substack{\text{the quotient} \\ \text{of } p \text{ and } q}} = \underbrace{3(p+q)}_{\substack{\text{three times the} \\ \text{sum of } p \text{ and } q}} \underbrace{-12}_{\substack{\text{twelve less than}}}$$

Section 2-2

1. 29

$$\text{Given } -11 + x = 9.$$

$$\begin{aligned} 20 - (11 - x) &= 20 - 11 + x = 20 + (-11 + x) \\ &= 20 + 9 = 29 \end{aligned}$$

2. 27

$$\begin{aligned} 33 - a &= a + 27 - 5a \\ 33 - a &= 27 - 4a && \text{Simplify.} \\ 33 - a + 4a &= 27 - 4a + 4a && \text{Add } 4a \text{ to each side.} \\ 33 + 3a &= 27 && \text{Simplify.} \end{aligned}$$

3. $\frac{5}{2}$

$$\frac{1}{2}x - 3 = \frac{3}{4} - x$$

Multiply by 4 on both sides of the equation to simplify the given equation.

$$\begin{aligned} 4\left(\frac{1}{2}x - 3\right) &= 4\left(\frac{3}{4} - x\right) \\ 2x - 12 &= 3 - 4x && \text{Distributive Property} \\ 2x - 12 + 4x &= 3 - 4x + 4x && \text{Add } 4x \text{ to each side.} \\ 6x - 12 &= 3 && \text{Simplify.} \\ 6x - 12 + 12 &= 3 + 12 && \text{Add 12 to each side.} \\ 6x &= 15 && \text{Simplify.} \\ x &= \frac{15}{6} = \frac{5}{2} \end{aligned}$$

4. 4

$$\begin{aligned} x - (3 - 2x) + (4 - 5x) &= -7 \\ x - 3 + 2x + 4 - 5x &= -7 && \text{Simplify.} \\ -2x + 1 &= -7 && \text{Simplify.} \\ -2x + 1 - 1 &= -7 - 1 && \text{Subtract 1.} \\ -2x &= -8 && \text{Simplify.} \\ x &= \frac{-8}{-2} = 4 \end{aligned}$$

5. 136

$$\underbrace{\frac{3}{4}x}_{\substack{\text{three quarters} \\ \text{of a number}}} \underbrace{-}_{\substack{\text{decreased by}}} \underbrace{20}_{\substack{\text{twenty}}} \underbrace{=}_{\substack{\text{equals}}} \underbrace{82}_{\substack{\text{eighty two}}}$$

$$\frac{3}{4}x - 20 + 20 = 82 + 20 \quad \text{Add 20 to each side.}$$

$$\frac{3}{4}x = 102 \quad \text{Simplify.}$$

$$x = \frac{4}{3} \cdot 102 = 136$$

6. B

$$\underbrace{2\frac{3}{5}x}_{\substack{\text{two and three fifth} \\ \text{of a number}}} \underbrace{=}_{\substack{\text{equals}}} \underbrace{-26}_{\substack{\text{negative twenty six}}}$$

$$\frac{13}{5}x = -26 \quad 2\frac{3}{5} = \frac{13}{5}$$

$$\frac{5}{13} \cdot \frac{13}{5}x = \frac{5}{13} \cdot -26 \quad \text{Multiply each side by } \frac{5}{13}.$$

$$x = -10$$

7. C

Let x = the total students in the high school.

$$\text{Then } \frac{2}{9}x = 142.$$

$$x = \frac{9}{2} \cdot 142 = 639$$

8. C

$$820c + 380r = 4,360$$

Substitute 3 for c in the equation above since c represents the number of cups of cashews.

$$820(3) + 380r = 4,360$$

$$2,460 + 380r = 4,360 \Rightarrow 380r = 1,900$$

$$\Rightarrow r = 5$$

Section 2-3

1. 6

$$7n + 3 = 2n - 12 \Rightarrow 5n = -15 \Rightarrow n = -3$$

$$\text{Therefore, } -n + 3 = -(-3) + 3 = 3 + 3 = 6.$$

2. 2

$$7(h - 5) - 3h = \frac{3}{2}h \Rightarrow 7h - 35 - 3h = \frac{3}{2}h$$

$$\Rightarrow 4h - 35 = \frac{3}{2}h \Rightarrow 4h - \frac{3}{2}h = 35$$

$$\Rightarrow \frac{5}{2}h = 35 \Rightarrow h = 35 \cdot \frac{2}{5} = 14$$

$$\text{Therefore, } \frac{1}{7}h = \frac{1}{7}(14) = 2.$$

3. 3

$$\frac{r}{3} + \frac{s}{11} = \frac{39}{33} \text{ and } s = 2 \Rightarrow \frac{r}{3} + \frac{2}{11} = \frac{39}{33}$$

To simplify the equation, multiply both sides of the equation by 33, which is the LCD of 3 and 11.

$$33\left(\frac{r}{3} + \frac{2}{11}\right) = 33 \cdot \frac{39}{33} \Rightarrow 11r + 6 = 39 \\ \Rightarrow 11r = 33 \Rightarrow r = 3$$

4. 3

$$\frac{9-2k}{3} = k-2$$

To simplify the equation, multiply both sides of the equation by 3.

$$3\left(\frac{9-2k}{3}\right) = 3(k-2) \Rightarrow 9-2k = 3k-6 \\ \Rightarrow -2k-3k = -6-9 \Rightarrow -5k = -15 \\ \Rightarrow k = 3$$

5. 52

Let p = the cost of a pair of pants.

Since a \$48 shirt costs \$22 more than one half the cost of a pair of pants, you can set up the following equation.

$$48 = \frac{1}{2}p + 22 \\ \Rightarrow 26 = \frac{1}{2}p \Rightarrow 52 = p$$

6. 5

$$\underbrace{2n+11}_{\substack{\text{twice a number} \\ \text{increased by 11}}} = \underbrace{6n-9}_{\substack{\text{six times the number} \\ \text{decreased by 9}}}$$

$$2n+11 = 6n-9 \Rightarrow 20 = 4n \Rightarrow n = 5$$

7. 48

$$\underbrace{\frac{1}{2}n+3}_{\substack{\text{one half of number} \\ \text{increased by three}}} = \underbrace{\frac{2}{3}n-5}_{\substack{\text{five less than two thirds} \\ \text{of the number}}}$$

To simplify the equation, multiply both sides of the equation by 6, which is the LCD of 2 and 3.

$$6\left(\frac{1}{2}n+3\right) = 6\left(\frac{2}{3}n-5\right) \\ 3n+18 = 4n-30 \\ \text{Solving for } n \text{ yields } n = 48.$$

8. 19

Let n be the first of the three consecutive odd integers, so n , $n+2$, and $n+4$ are the three

consecutive odd integers.

$$\underbrace{4(n+4)}_{\substack{4 \text{ times the greatest of 3} \\ \text{consecutive odd integers}}} = \underbrace{3n}_{\substack{3 \text{ times the least of 3} \\ \text{consecutive odd integers}}} + \underbrace{31}_{\substack{\text{exceeds} \\ \text{by 31}}}$$

$$4(n+4) = 3n+31 \\ 4n+16 = 3n+31 \Rightarrow n = 15$$

The greatest of the three consecutive odd integers is $n+4 = 15+4 = 19$.

Section 2-4

1. D

$$\frac{1}{3}(9-6x) = 5-2x \\ 3-2x = 5-2x \quad \text{Distributive Property} \\ 3-2x+2x = 5-2x+2x \quad \text{Add } 2x \text{ to each side.} \\ 3 = 5$$

The given equation is equivalent to the false statement $3 = 5$. Therefore the equation has no solution.

2. D

$$5(x-2)-3x = 2(x-10) \\ 5x-10-3x = 2x-20 \quad \text{Distributive Property} \\ 2x-10 = 2x-10 \quad \text{Simplify.}$$

The given equation is equivalent to $2x-10 = 2x-10$, which is true for all values of x .

3. A

$$\frac{1}{3}(15-6x) = 5-ax \\ 5-2x = 5-ax \quad \text{Distributive Property}$$

If the linear equation is an identity, the value of a is 2.

4. C

$$4x+13 = 7(x-2)+bx \\ 4x+13 = 7x-14+bx \\ 4x+13 = (7+b)x-14 \\ \text{If } 4 = 7+b, \text{ the linear equation has no solution.} \\ \text{Solving for } b \text{ yields } b = -3.$$

5. $\frac{1}{2}$

$$-\frac{7}{2}(2n-3)+4n = \frac{3}{2}(5+2n)$$

To simplify the equation, multiply both sides of the equation by 2.

$$2\left[-\frac{7}{2}(2n-3)+4n\right]=2\left[\frac{3}{2}(5+2n)\right]$$

$$-7(2n-3)+8n=3(5+2n) \quad \text{Distributive Property}$$

$$-14n+21+8n=15+6n \quad \text{Simplify.}$$

$$-6n+21=15+6n \quad \text{Simplify.}$$

$$-6n+21+6n=15+6n+6n \quad \text{Add } 6n \text{ to each side.}$$

$$21=15+12n$$

$$21-15=15+12n-15 \quad \text{Subtract 15.}$$

$$6=12n \text{ or } 12n=6 \quad \text{Simplify.}$$

$$n=\frac{6}{12}=\frac{1}{2}$$

6. $\frac{3}{4}$

$$\frac{13-7(k+1)}{3}=3k-2$$

To simplify the equation, multiply both sides of the equation by 3.

$$3\left[\frac{13-7(k+1)}{3}\right]=3[3k-2]$$

$$13-7(k+1)=9k-6 \quad \text{Simplify.}$$

$$13-7k-7=9k-6 \quad \text{Distributive Property}$$

$$6-7k=9k-6 \quad \text{Simplify.}$$

$$6-7k-6=9k-6-6 \quad \text{Subtract 6.}$$

$$-7k=9k-12 \quad \text{Simplify.}$$

$$-7k-9k=9k-12-9k \quad \text{Subtract } 9k.$$

$$-16k=-12$$

$$k=\frac{-12}{-16}=\frac{3}{4}$$

7. 2

$$-2[3-(x-4)]+5x=2-x$$

$$-2[3-x+4]+5x=2-x$$

$$-2[7-x]+5x=2-x$$

$$-14+2x+5x=2-x$$

$$-14+7x=2-x$$

$$8x=16$$

$$x=2$$

8. 0.8

$$0.4(5m-9)=-5m-4(0.3-m)$$

$$2m-3.6=-5m-1.2+4m$$

$$2m-3.6=-m-1.2$$

$$3m=2.4$$

$$m=0.8$$

Section 2-5

1. B

$$2x+3y=18$$

$$2x+3y-2x=18-2x \quad \text{Subtract } 2x \text{ from each side.}$$

$$3y=18-2x \quad \text{Simplify.}$$

$$\frac{3y}{3}=\frac{18}{3}-\frac{2x}{3} \quad \text{Divide each side by 3.}$$

$$y=6-\frac{2}{3}x \quad \text{Simplify.}$$

2. C

$$P=2l+2w$$

$$P-2l=2l+2w-2l \quad \text{Subtract } 2l \text{ from each side.}$$

$$P-2l=2w \quad \text{Simplify.}$$

$$\frac{P}{2}-\frac{2l}{2}=\frac{2w}{2} \quad \text{Divide each side by 2.}$$

$$\frac{P}{2}-l=w \quad \text{Simplify.}$$

3. A

$$c=\frac{a}{a+b}$$

$$(a+b)c=(a+b)\frac{a}{a+b} \quad \text{Multiply each side by } a+b.$$

$$ac+bc=a \quad \text{Simplify.}$$

$$ac+bc-ac=a-ac \quad \text{Subtract } ac \text{ from each side.}$$

$$bc=a-ac \quad \text{Simplify.}$$

$$bc=a(1-c) \quad \text{Factor.}$$

$$\frac{bc}{1-c}=a \quad \text{Divide each side by } 1-c.$$

4. A

$$\frac{ab-1}{3}=c$$

$$3\left[\frac{ab-1}{3}\right]=3c \quad \text{Multiply each side by 3.}$$

$$ab-1=3c \quad \text{Simplify.}$$

$$ab-1+1=3c+1 \quad \text{Add 1 to each side.}$$

$$ab=3c+1 \quad \text{Simplify.}$$

$$\frac{ab}{a}=\frac{3c+1}{a} \quad \text{Divide each side by } a.$$

$$b=\frac{3c+1}{a} \quad \text{Simplify.}$$

5. D

$$gh - f = g - h$$

$$gh - f + f = g - h + f \quad \text{Add } f \text{ to each side.}$$

$$gh = g - h + f \quad \text{Simplify.}$$

$$gh - g = g - h + f - g \quad \text{Subtract } g \text{ from each side.}$$

$$gh - g = f - h \quad \text{Simplify.}$$

$$g(h-1) = f - h \quad \text{Factor.}$$

$$g = \frac{f-h}{h-1} \quad \text{Divide each side by } h-1.$$

6. D

$$n = a + (k-1)d$$

$$n = a + kd - d \quad \text{Distributive Property}$$

$$n - a + d = a + kd - d - a + d \quad \text{Add } -a + d \text{ to each side.}$$

$$n - a + d = kd \quad \text{Simplify.}$$

$$\frac{n-a+d}{d} = k \quad \text{Divide each side by } d.$$

Chapter 2 Practice Test

1. C

$$\frac{5}{6}x = \frac{4}{5}$$

$$\frac{6}{5} \cdot \frac{5}{6}x = \frac{6}{5} \cdot \frac{4}{5} \quad \text{Multiply each side by } \frac{6}{5}.$$

$$x = \frac{24}{25}$$

2. B

$$\underbrace{\frac{1}{2}n}_{\frac{1}{2} \text{ of a number } n} \quad \underbrace{-4}_{\text{decreased by 4}} = \underbrace{-6}_{\text{negative 6}}$$

$$\frac{1}{2}n - 4 + 4 = -6 + 4 \quad \text{Add 4 to each side.}$$

$$\frac{1}{2}n = -2 \quad \text{Simplify.}$$

$$2 \cdot \frac{1}{2}n = 2 \cdot -2 \quad \text{Multiply each side by 2.}$$

$$n = -4 \quad \text{Simplify.}$$

Three times n added to 7 is $3n + 7$.

$$3n + 7$$

$$= 3(-4) + 7 \quad \text{Substitute } -4 \text{ for } n.$$

$$= -5$$

3. C

$$\underbrace{4 - 7x}_{4-7x \text{ is 5 less than 23}} = 23 - 5$$

$$4 - 7x = 18 \Rightarrow -7x = 14 \Rightarrow x = -2$$

$$3x = 3(-2) = -6$$

4. D

$$P = F\left(\frac{1}{2}v^2 + 1\right)$$

$$\frac{P}{F} = \frac{F}{F}\left(\frac{1}{2}v^2 + 1\right) \quad \text{Divide each side by } F.$$

$$\frac{P}{F} = \frac{1}{2}v^2 + 1 \quad \text{Simplify.}$$

$$\frac{P}{F} - 1 = \frac{1}{2}v^2 + 1 - 1 \quad \text{Subtract 1 from each side.}$$

$$\frac{P}{F} - 1 = \frac{1}{2}v^2 \quad \text{Simplify.}$$

$$2\left(\frac{P}{F} - 1\right) = 2 \cdot \frac{1}{2}v^2 \quad \text{Multiply each side by 2.}$$

$$2\left(\frac{P}{F} - 1\right) = v^2 \quad \text{Simplify.}$$

$$2\left(\frac{P}{F} - \frac{F}{F}\right) = v^2 \quad \frac{F}{F} = 1$$

$$2\left(\frac{P-F}{F}\right) = v^2 \quad \text{The common denominator is } F.$$

Combine the numerators.

5. C

$$\underbrace{\frac{1}{2}n + 10}_{\substack{\frac{1}{2} \text{ of the number } n \\ \text{increased by 10}}} = \underbrace{2n - 4}_{\substack{\text{four less than twice} \\ \text{the number}}}$$

6. A

$$\underbrace{a = \frac{1}{2}c - b}_{a \text{ is } b \text{ less than } \frac{1}{2} \text{ of } c}$$

$$a - \frac{1}{2}c = \frac{1}{2}c - b - \frac{1}{2}c \quad \text{Add } -\frac{1}{2}c \text{ to each side.}$$

$$a - \frac{1}{2}c = -b \quad \text{Simplify.}$$

$$(-1)\left[a - \frac{1}{2}c\right] = (-1)(-b) \quad \text{Multiply each side by } -1.$$

$$-a + \frac{1}{2}c = b \quad \text{or} \quad \frac{1}{2}c - a = b$$

7. B

$$\begin{array}{ll} x = 1 - y & \text{First equation} \\ 3x = 8 - 5y & \text{Second equation} \end{array}$$

Solving the first equation for y yields $y = 1 - x$.
Substitute $1 - x$ for y in the second equation.

$$\begin{array}{ll} 3x = 8 - 5(1 - x) & \text{Substitution} \\ 3x = 8 - 5 + 5x & \text{Distributive property} \\ 3x = 3 + 5x & \text{Simplify.} \\ 3x - 5x = 3 + 5x - 5x & \text{Subtract } 5x \text{ from each side.} \\ -2x = 3 & \text{Simplify.} \\ \frac{-2x}{-2} = \frac{3}{-2} & \text{Divide each side by } -2. \\ x = -\frac{3}{2} & \text{Simplify.} \end{array}$$

8. D

$$\underbrace{\frac{x}{5}}_{\substack{\text{the quotient of} \\ \text{of a number and 5}}} = \underbrace{\frac{1}{2}x - 9}_{\substack{\text{nine less than one} \\ \text{half of the number}}}$$

$$\begin{array}{ll} 10\left(\frac{x}{5}\right) = 10\left(\frac{1}{2}x - 9\right) & \text{Multiply each side by 10.} \\ 2x = 5x - 90 & \text{Distributive Property} \\ 2x - 5x = 5x - 90 - 5x & \text{Subtract } 5x \text{ from each side.} \\ -3x = -90 & \text{Simplify.} \\ \frac{-3x}{-3} = \frac{-90}{-3} & \text{Divide each side by } -3. \\ x = 30 & \text{Simplify.} \end{array}$$

9. 0

$$\begin{array}{ll} \frac{a}{b} = 1 & \\ b\left(\frac{a}{b}\right) = b(1) & \text{Multiply each side by } b. \\ a = b & \text{Simplify.} \\ a - b = b - b & \text{Subtract } b \text{ from each side.} \\ a - b = 0 & \text{Simplify.} \end{array}$$

10. 1.43

As the object moves upward, its speed decreases continuously and becomes 0 as it reaches its maximum height.

$v = v_0 - 9.8t$ is the given equation. Substituting 14 for v_0 and 0 for v gives $0 = 14 - 9.8t$.

Solving the equation for t gives $t = \frac{14}{9.8} = 1.428$

seconds, which is 1.43 to the nearest hundredth of a second.

11. 3

When the object hits the ground, the height is 0.
Substitute 0 for h and 144 for s in the equation

$$0 = -16t^2 + 144. \text{ Solving the equation for } t^2 \text{ gives } t^2 = \frac{144}{16} = 9.$$

$$\text{Therefore, } t = \sqrt{9} = 3.$$