1.3 Start Thinking

One common use of an equation with variables on both sides involves situations in which two distances are the same, but the rates of travel are different (for example, the speed of a car). List three separate real-life examples where this concept could be applied.

1.3 Warm Up

Use the Distributive Property to simplify the expression.

1. $5(u - 5)$

2. $17(2 + n)$

3. $-5(e - 4)$

4. $-3(t + 7)$

5. $4(v - 6)$

6. $4(a + 5)$

1.3 Cumulative Review Warm Up

Simplify the expression.

1. $-1 + (-1) + (-1)$

2. $(10)(-10)(-10)(10)$

3. $-6 - (-6)$

4. $\frac{300}{-3} \div \frac{300}{3}$

5. $4 + 4 - 4 + 4 - 4 + 4$

6. $2(10 - 2)(2 - 8)(6 - 2)(2 - 4)(2 - 2)$

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1.3 Practice A

In Exercises 1–8, solve the equation. Check your solution.

1. $4x - 7 = -3x$

2. $8b + 2 = 3b + 12$

3. $7k + 24 = -16 - 3k$

4. $-5t + 7 = 11t - 25$

5. $6n + 1 = 2n - 7$

6. $8h + 5 - 3h = 8h - 4$

7. $g - 10 + 7g = 15 + 3g$

8. $-3(w + 4) = 4w - 5$

9. In the equation $35t + 70(7 - t) = 385$, the variable t represents the number of hours you drove at 35 miles per hour on a 385-mile trip. How many hours did you drive at 35 miles per hour?

In Exercises 10–13, solve the equation, if possible. Determine whether the equation has *one solution, no solution,* or *infinitely many solutions.*

10. $7y + 13 = 5y - 3$

11. $8 + 9p = 9p - 7$

12. $3(7r - 2) = 21r - 6$

13. $2(3x + 6) = 3(2x - 6)$

14. Describe and correct the error in solving the equation.

$$\begin{aligned} 2(s - 5) &= 2(s + 5) \\ 2s - 10 &= 2s - 10 \\ 2s &= 2s \\ 0 &= 0 \end{aligned}$$

The equation has infinitely many solutions.

15. One serving of oatmeal provides 16% of the dietary fiber you need daily. You must get the remaining 21 grams of dietary fiber from other sources.

a. How many grams of dietary fiber do you need daily?

b. Fifty percent of the dietary fiber in one serving of oatmeal is soluble fiber. How many grams of soluble fiber are in one serving of oatmeal?

In Exercises 16 and 17, find the value of *r*.

16. $5(x - 4) + 4 + r = 4(x + 3) + x$

17. $3(2x - 2) - r + 3x = 2(7x + 1) - 5x - 9$

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1.3 Practice B

In Exercises 1–8, solve the equation. Check your solution.

1. $5t + 7 = 3t - 9$

2. $-8u + 3 = 2u - 17$

3. $6w + 3 - 10w = 7w - 8$

4. $-a + 4a - 9 = 8a + 6$

5. $9(k - 2) = 3(k + 4)$

6. $-2(x - 4) = 7(x - 4)$

7. $\frac{2}{3}(3 - 6x) = -3(8x - 4)$

8. $8(3g + 2) - 3g = 3(5g - 4) - 2$

In Exercises 9–12, solve the equation, if possible. Determine whether the equation has *one solution, no solution,* or *infinitely many solutions.*

9. $5(2f + 3) = 2(5f - 1)$

10. $\frac{1}{3}(12 - 24v) = -2(4v - 2)$

11. $3(k + 1) + 11k = 2(4 + 5k) + 3$

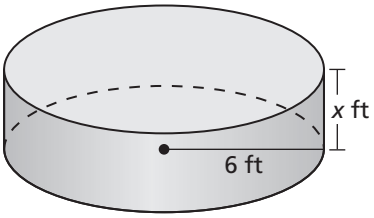
12. $-4(-m + 2) + 2m = -\frac{1}{2}(10 - 12m) - 3$

13. Using the information in the table, write and solve an equation to find the number of toppings when you would pay the same amount for Pizza A and Pizza B.

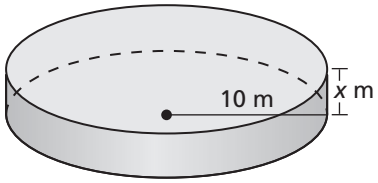
	Cheese pizza	Price per topping
Pizza A	\$10	\$1.50
Pizza B	\$12.50	\$1.00

In Exercises 14 and 15, the value of the surface area of the cylinder is equal to the value of the volume of the cylinder. Find the value of *x*. Then find the surface area and volume of the cylinder.

14.



15.



16. Four times the greater of two consecutive integers is 18 more than three times the lesser integer. What are the integers?

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1.3 Enrichment and Extension

Identities and No-Solution Equations

An *identity* is an equation that is true for every value of the variable. When you solve an identity equation, your result will be a true statement. On the other hand, if an equation results in an untrue statement, there is no possible solution.

Example:

Solve $5x - (3x + 7) = 9 + 2(x - 8)$.

$$\begin{aligned} 5x - (3x + 7) &= 9 + 2(x - 8) \\ 5x - 3x - 7 &= 9 + 2x - 16 \\ 2x - 7 &= 2x - 7 \end{aligned}$$

Example:

Solve $x - (5x + 2) = -4(x - 3)$.

$$\begin{aligned} x - (5x + 2) &= -4(x - 3) \\ x - 5x - 2 &= -4x + 12 \\ -4x - 2 &= -4x + 12 \\ -2 &\neq 12 \end{aligned}$$

In Exercises 1–4, determine whether the equation is an identity or no-solution equation. If the equation is neither, find the solution.

1. $-5(2 - 3x) = 3(1 - 5x) + 1$
2. $4(5p + 7) - 4p = 6(5 + 3p) - 2(p + 1)$
3. $2(7w - 1) + 5w = w + 3(4w + 3) + 2(3w - 9)$
4. $9 - (9 - y) - 9 = 9(9 + y) - 9$
5. Use the true statement $5x - 3 = 5x - 3$ to write your own identity.
6. Use the false statement $5 \neq 7$ to write your own no-solution equation.
7. Create an equation with a solution of $x = 5$.

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1.3 Puzzle Time

What Is The Best Way To Communicate With A Fish?

Write the letter of each answer in the box containing the exercise number.

Find the value of the variable which satisfies the equation.

1. $14 - 3x = 4x$

2. $6a - 10 = 3a + 17$

3. $9 + 5w - 14w = 12 - 6w$

4. $12(b + 2) = 8(b + 5)$

5. $6(y + 8) = 3(2y - 7)$

6. $\frac{3}{4}(12c - 4) = 15c + 15$

7. $11(4p + 4) - 4p = 4(7p - 7)$

8. $3(2d - 8) = 11d - 18(d - 3)$

9. $5(4 + r) = \frac{1}{2}(40 + 10r)$

10. $\frac{3}{5}e - 6 = -\frac{2}{5}(e - 10) - 7$

11. Three consecutive integers are n, $n + 1$, and $n + 2$. Four times the sum of the least and greatest integers is 12 less than three times the least integer. What is the least integer?

Answers

P. 4

L. 3

E. 9

I. 6

N. no solution

A. 2

D. infinitely many solutions

T. -6

R. -4

I. -1

O. -3

9	11	6	4		3	7		1		10	8	5	2