

Elaborate

10. How can you use properties to solve equations with variables on both sides?

11. How is a table helpful when constructing equations?

12. When solving a real-world problem to find a person's age, would a negative solution make sense? Explain.

13. Essential Question Check-In How do you write an equation to represent a real-world situation?

Evaluate: Homework and Practice



- Online Homework
- Hints and Help
- Extra Practice

Write an equation for each description.

1. The sum of 14 and a number is equal to 17.

$$14 + n = 17$$

2. A number increased by 10 is 114.

$$n + 10 = 114$$

3. The difference between a number and 12 is 20.

$$n - 12 = 20$$

4. Ten times the sum of half a number and 6 is 8.

$$10 \left(\frac{1}{2}n + 6 \right) = 8$$

5. Two-thirds a number plus 4 is 7.

$$\frac{2}{3}n + 4 = 7$$

5. Tanmayi wants to raise \$175 for a school fundraiser. She has raised \$120 so far. How much more does she need to reach her goal?

$$175 - 120 = x$$

7. Hector is visiting a cousin who lives 350 miles away. He has driven 90 miles. How many more miles does he need to drive to reach his cousin's home?

$$90 + x = 350$$

8. The length of a rectangle is twice its width. The perimeter of the rectangle is 126 feet.



Write and solve an equation for each situation.

9. In one baseball season, Peter hit twice the difference of the number of home runs Alice hit and 6. Altogether, they hit 18 home runs. How many home runs did each player hit that season?

Let $a =$ Alice's homeruns
 $2(a-6) =$ Peter

Alice hit 10
 Peter hit 8

$$a + 2(a-6) = 18$$

$$3a - 12 = 18$$

$$3a = 30$$

$$a = 10$$



10. The perimeter of a parallelogram is 72 meters. The width of the parallelogram is 4 meters less than its length. Find the length and the width of the parallelogram.

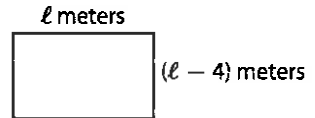
$$2(l-4) + 2l = 72$$

$$4l - 8 = 72$$

$$4l = 80$$

$$l = 20$$

length = 20m
 width = 16m



11. One month, Ruby worked 6 hours more than Isaac, and Svetlana worked 4 times as many hours as Ruby. Together they worked 126 hours. Find the number of hours each person worked.

Let $x =$ # of Isaac's hours
 $x + 6 =$ Ruby's hours
 $4(x + 6) =$ Svetlana's hours

$$x + x + 6 + 4(x + 6) = 126$$

$$6x + 30 = 126$$

$$6x = 96$$

$$x = 16$$

Isaac worked 16 hours
 Ruby worked 22
 Svetlana worked 88

12. In one day, Annie traveled 5 times the sum of the number of hours Brian traveled and 2. Together they traveled 20 hours. Find the number of hours each person traveled.

Let $b =$ Brian's time
 $5(b + 2) =$ Annie's time

$$b + 5(b + 2) = 20$$

$$b + 5b + 10 = 20$$

$$6b = 10$$

$$b = \frac{10}{6} = \frac{5}{3}$$

Brian = $\frac{5}{3}$ hours
 Annie = $5(\frac{5}{3} + 2)$
 $= 5(\frac{11}{3}) = \frac{55}{3}$ hours

13. Xian and his cousin Kai both collect stamps. Xian has 56 stamps, and Kai has 80 stamps. The boys recently joined different stamp-collecting clubs. Xian's club will send him 12 new stamps per month. Kai's club will send him 8 new stamps per month. After how many months will Xian and Kai have the same number of stamps? How many stamps will each have?

Let $m =$ # of months
 Xian stamps = $56 + 12m$
 Kai stamps = $80 + 8m$

$$56 + 12m = 80 + 8m$$

$$56 + 4m = 80$$

$$4m = 24$$

$$m = 6$$

6 months, 128 stamps



14. Kenya plans to make a down payment plus monthly payments in order to buy a motorcycle. At one dealer she would pay \$2,500 down and \$150 each month. At another dealer, she would pay \$3,000 down and \$125 each month. After how many months would the total amount paid be the same for both dealers? What would that amount be?

Dealer 1 = $2,500 + 150m$
 Dealer 2 = $3,000 + 125m$

Let $m =$ # of months

$$2500 + 150m = 3000 + 125m$$

$$2500 + 25m = 3000$$

$$25m = 500$$

$m = 20$ months

$$2500 + 150(20) = 5,500$$

© Houghton Mifflin Harcourt Publishing Company - Image Credits: (t) Peter Kim/Shutterstock

15. Community Gym charges a \$50 membership fee and a \$55 monthly fee. Workout Gym charges a \$200 membership fee and a \$45 monthly fee. After how many months will the total amount of money paid to both gyms be the same? What will the amount be?

$Community = 50 + 55m$
 $Workout = 200 + 45m$
 $50 + 55m = 200 + 45m$
 $10m = 150$
 $m = 15 \text{ months}$
 $50 + 55(15) = \$875$

16. Tina is saving to buy a notebook computer. She has two options. The first option is to put \$200 away initially and save \$10 every month. The second option is to put \$100 away initially and save \$30 every month. After how many months would Tina save the same amount using either option? How much would she save with either option? Let $m = \# \text{ months}$

$Option 1: 200 + 10m$
 $Opt 2: 100 + 30m$
 $200 + 10m = 100 + 30m$
 $100 = 20m$
 $5 = m$
 5 months
 $200 + 10(5) = \$250$

Use the table to answer each question.

	Starting Salary	Yearly Salary Increase
Company A	\$24,000	\$3000
Company B	\$30,000	\$2400
Company C	\$36,000	\$2000

$24000 + 3000y$
 $30000 + 2400y$
 $36000 + 2000y$

17. After how many years are the salaries offered by Company A and Company B the same?

$24000 + 3000y = 30000 + 2400y$
 $y = 10 \text{ years}$

18. After how many years are the salaries offered by Company B and Company C the same?

$30000 + 2400y = 36000 + 2000y$
 $y = 15 \text{ years}$

19. Paul started work at Company B ten years ago at the salary shown in the table. At the same time, Sharla started at Company C at the salary shown in the table. Who earned more during the last year? How much more?

$B: 30000 + 2400(10) = \$54,000$
 $C: 36000 + 2000(10) = \$56,000$
 Sharla earned \$2,000 more

20. George's page contains twice as many typed words as Bill's page and Bill's page contains 50 fewer words than Charlie's page. If each person can type 60 words per minute, after one minute, the difference between twice the number of words on Bill's page and the number of words on Charlie's page is 210. How many words did Bill's page contain initially? Use a table to organize the information.

	Current # of words	Words in 1 min
George	$2x - 100$	$2x - 100 + 60 = 2x - 40$
Bill	$x - 50$	$x - 50 + 60 = x + 10$
Charlie	x	$x + 60$

$2(x + 10) - (x + 60) = 210$
 $2x + 20 - x - 60 = 210$
 $x = 250 \text{ words}$
 $1 = 250$

Bill had 200 words

- 21. Geometry** Sammie bought just enough fencing to border either a rectangular plot or a square plot, as shown. The perimeters of the plots are the same. How many meters of fencing did she buy?

$$4(x+2) = 2(3x+2) + 2(x-1)$$

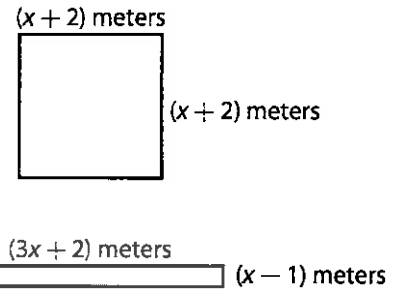
$$4x+8 = 6x+4 + 2x-2$$

$$4x+8 = 8x+2$$

$$x = 1.5$$

$$4(1.5+2)$$

$$4(3.5) = 52.5m$$



H.O.T. Focus on Higher Order Thinking

- 22. Justify Reasoning** Suppose you want to solve the equation $2a + b = 2a$, where a and b are nonzero real numbers. Describe the solution to this equation. Justify your description.

- 23. Multi-Step** A patio in the shape of a rectangle, is fenced on all sides with 134 feet of fencing. The patio is 5 feet less wide than it is long.

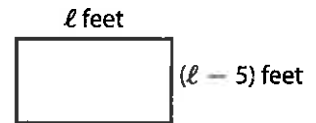
- a. What information can be used to solve the problem? How can you find the information?

134 feet of fencing
Use picture

$$2l + 2(l-5) = 134$$

$$4l - 10 = 134$$

$$l = 36$$



- b. Describe how to find the area of the patio. What is the area of the patio?

$$36 \times 31 = 1,116 \text{ ft}^2$$

- 24. Explain the Error** Kevin and Brittany write an equation to represent the following relationship, and both students solve their equation. Who found the correct equation and solution? Why is the other person incorrect?

5 times the difference of a number and 20 is the same as half the sum of 4 more than 4 times a number.

Kevin:

$$5(x - 20) = \frac{1}{2}(4x + 4)$$

$$5x - 100 = 2x + 2$$

$$3x - 100 = 2$$

$$3x = 102$$

$$x = 34$$

Brittany:

$$5(20 - x) = \frac{1}{2}(4x + 4)$$

$$100 - 5x = 2x + 2$$

$$100 - 7x = 2$$

$$-7x = -98$$

$$x = 14$$

Kevin is correct. "Difference of a number and 20"
 $\hookrightarrow x - 20$