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Lesson 8.4 Real-World Problems: Equations and Inequalities

Write and solve an algebraic equation or inequality for each problem. Show your work.

1. When a number is doubled, the result is 48. What is the number?

2. After students borrowed 28 novels from the school library, there were 35 novels left. How many novels were in the school library at first?

3. In a swimming class, $\frac{2}{5}$ of the participants are girls. There are 24 boys in the class. Find the total number of participants in the class.

4. Claire jogs around an oval track and is able to complete one lap in 5 minutes. If she jogs at the same pace for 42 minutes, how many laps would she be able to jog? Write an inequality and find the number of whole laps Claire completes.

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5. A box can hold a maximum of 60 comic books. If comic books are bundled together in groups of 8, write and solve an inequality to find the maximum number of bundles of comic books that the box can carry.

6. When a number is tripled and 8 is subtracted from the result, the answer is 16. What is the number?

7. The difference of two numbers is 117. The greater number is 4 times the other number. What is the smaller number?

8. Jason's age is 3 times Shauna's present age. In 4 years' time, the sum of their ages will be 56 years. Find their present ages.

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9. Mrs. Jones buys 7 T-shirts and 6 hats for $86. The price of each T-shirt is $3 more than the price of each hat. How much does Mrs. Jones pay for each item?

10. For every 15 students on a field trip, there needs to be one teacher. How many teachers are needed for a group of 100 students?

11. Karen has some lawn chairs. Jenny has twice as many lawn chairs as Karen, and Rico has 3 more lawn chairs than Karen. Together, they have a total of 25 lawn chairs. How many lawn chairs does Karen have?

12. Jared has some quarters and dimes that total $5.50. If he has 8 more quarters than dimes, how many dimes does Jared have?

Lesson 8.4

1. $2x = 48$
$x = 24$
The number is 24.

2. $b - 28 = 35$
$b = 35 + 28$
$b = 63$
There were 63 novels in the school library at first.

3. $\frac{3}{5}s = 24$
$\frac{1}{5}s = 8$
$s = 40$
There are 40 participants in the swimming class.

4. $5h < 42$
$h < 8.4$
$h = 8$
Claire completes 8 laps.

5. $8c \leq 60$
$c \leq 7.5$
$c = 7$
The box can hold 7 bundles of comic books.

6. $3y - 8 = 16$
$3y = 16 + 8$
$y = 8$

7. $4k - k = 117$
$3k = 117$
$k = 39$

8. In 4 years' time, Shauna will be $(d + 4)$ years old and Jason will be $(3d + 4)$ years old.
$d + 4 + 3d + 4 = 56$
$4d + 8 = 56$
$4d = 48$
$d = 12$ (Shauna)
$3d = 3 \cdot 12 = 36$ (Jason)
Shauna is 12 years old and Jason is 36 years old.

9. If x dollars is the price of each hat, then each T-shirt costs $(x + 3)$ dollars.
$6x + 7(x + 3) = 86$
$6x + 7x + 21 = 86$
$13x + 21 - 21 = 86 - 21$
$13x = 65$
$x = 5$ (hat)
$x + 3 = 8$ (T-shirt)
Mrs. Jones pays \$5 for a hat and \$8 for a T-shirt.

10. Let y the number of teachers needed
$15y \geq 100$
$y \geq 6\frac{2}{3}$
$y = 7$
7 teachers are needed.

11. Let x be the number of Karen's lawn chairs.
$x + 2x + x + 3 = 25$
$4x + 3 = 25$
$4x = 28$
$x = 7$
Karen has 7 lawn chairs.

12. Let y be the number of dimes Jared has.
$0.1y + 0.25(y + 8) = 5.5$
$0.1y + 0.25y + 2 = 5.5$
$0.35y + 2 = 5.5$
$0.35y = 3.5$
$y = 10$
Jared has 10 dimes.

Brain @ Work

1. If c is Montell's present age, then his mother is $(c + 30)$.
In 5 years, Montell will be $(c + 5)$ years old and his mother will be $(c + 35)$ years old.
$3(c + 5) = c + 35$
$3c + 15 = c + 35$
$3c + 15 - 15 = c + 35 - 15$
$3c = c + 20$
$3c - c = c - c + 20$
$2c = 20$
$c = 10$ (Montell)
$10 + 30 = 40$
Montell's mother is 40 years old now.

2. If w inches is the width, then the length is $2w$ inches.
The perimeter of the rectangle is $(w + 2w + w + 2w) = 6w$ inches.
$6w < 74$
$w < 12\frac{1}{3}$
Its maximum width is 12 inches.

Chapter 9

Lesson 9.1

1. $P(-4, 2)$ $Q(-3, 0)$
$R(-4, -1)$ $S(-3, -2)$
$T(0, -3)$ $U(7, -2)$
$V(2, 2)$ $W(4, 1)$

2.