

MATH 5: HANDOUT 5

WORD PROBLEMS

Today we talked more about solving word problems using equations. Here is an example of a problem solved using equations:

Problem: A messenger is sent from one city to another; he can travel 40 km a day. Next day, another messenger is sent, who can travel 45 km a day. When will he overtake the first messenger?

Solution: after x days, the first messenger has traveled $40x$ km, and the second one has travelled $45(x-1)$ km (he started one day later!). Thus, we have an equation

$$40x = 45(x - 1)$$

$$40x = 45x - 45$$

$$0 = 45x - 40x - 45$$

$$45 = 45x - 40x = 5x$$

$$x = 9$$

Homework

1. Solve the following equations:

(a) $4x - 9 = 15$

(b) $3x + 8 = -1$

(c) $7(u - 3) = 42$

2. A dog weighs 2 pounds more than a cat. 3 cats and 4 dogs together weigh 43 pounds. How much does a dog weigh? A cat?

3. A father is twice as old as his son. The sum of their ages is 48 years. How old is each of them?

4. A pet store sells parrots and canaries, A canary costs twice as much as a parrot. One customer bought 5 canaries and 3 parrots, while the other bought 3 canaries and 5 parrots. One of the customers paid \$20 more than the other. How much does each bird cost?

5. The day after Halloween, Tim and Alex were admitted to the hospital with stomach cramps. Their mother told the emergency room doctor that she had found 141 empty candy wrappers in the boys' room.

The hospital policy is to apply a stomach pump to anyone who ate more than 65 candies. Tim claims that he does not need the procedure since he ate 7 less pieces of candy than Alex. Is he going to get his stomach pumped? How about Alex?

6. Jim, Bob, Tom, and Siegfried are four hungry trolls who took part in a rock-eating contest. Jim gobbled down 1 less rock than Bob; Bob ate 1 less than Tom, and Tom 1 less than Siegfried. How many rocks did each troll eat if it is known that together they consumed 2010 rocks?

7. John and Sally together have 93 cents; John and Mina together have 104 cents; Sally and Mina together have 95 cents. How much money does each of them have?

8. *

(a) Show that $(a + 1)(a - 1) = a \cdot a - 1$

(b) Without using a calculator, compute 199999×200001