

# Math 1303 - Math in the Liberal Arts

Homework #6 - 2008.02.11

Due Date - 2008.02.18

## Solutions

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In the following exercises, let  $x$  represent the number. Use the given conditions to write an equation. Solve the equation and find the number.

1. The sum of five and three times a number is 29.

The equation:

$$5 + 3x = 29$$

The solution is  $x = 8$ .

2. A number increased by 12 is four times the number.

The equation:

$$12 + x = 4x$$

The solution is  $x = 4$ .

3. The quotient of three times a number and five, decreased by four is 34.

The equation:

$$\frac{3x}{5} - 4 = 34$$

The solution is  $x = \frac{190}{3}$ .

4. Nine times a number is 30 more than three times that number.

The equation:

$$9x = 3x + 30$$

The solution is  $x = 5$ .

5. Seven subtracted from five times a number is 123.

The equation:

$$5x - 7 = 123$$

The solution is  $x = 26$ .

Solve the following word problems.

6. In 2001, the most populous countries were China and India. In that year, China's population exceeded India's by 260 million. Combined, the two countries had a population of 2310 million. Determine the 2001 population for China and India.

Let  $C$  be the population of China,  $I$  the population of India. We have that  $C = I + 260$  and  $C + I = 2310$ . These two give  $2I + 260 = 2310$ . Solving for  $I$  we have  $I = 1025$  million people and  $C = 1285$  million people.

7. A repair bill on a yacht came to \$1603, including \$532 for parts and the remainder for labor. If the cost of labor is \$63 per hour, how many hours of labor did it take to repair the yacht?

Let  $x$  be the number of hours of labor to repair the yacht. The equation to solve is  $1603 = 532 + 63x$ , which gives  $x = 17$  hours.

8. The bus fair in a city is \$1.25. People who use the bus have the option of purchasing a monthly coupon book for \$21.00. With the coupon book, the fare is reduced to \$0.50. Determine the number of times in a month the bus must be used so that the total monthly cost without the coupon book is the same as the total monthly cost with the coupon book.

Let  $x$  be the number of trips on the bus. Then we want to know when  $21.00 + 0.5x = 1.25x$ . This gives  $x = 28$  trips.

9. Suppose that you have agreed to be paid 8 cents for every problem solved correctly out of a set of 26 problems. However, to spice things up, suppose that you have also agreed to be fined 5 cents for every problem done incorrectly. If at the end of 26 problems you have broken even, how many problems did you solve correctly?

Let  $x$  be the questions answered correctly, and  $y$  incorrectly. Then we have the two equations  $x + y = 26$  and  $8x - 5y = 0$ . From the first equation, we have  $y = 26 - x$ . Plugging this into the second equation gives  $x = 10$ . So the number of questions answered correctly is 10, and those incorrectly is 16.