

# Application Problems In Algebra

## Basic Algebra Word Problems (continued)

## SOLUTIONS

- 4) 50 cars and one locomotive weigh 4825 tons. (Each car is identical.)  
If the locomotive weighs 225 tons, how much does each car weigh?

$$\begin{array}{r} \text{Total weight} = \text{loco} + \text{cars} \\ \text{let } c = \text{number of cars} \\ \text{Weight} = 225 \text{ tons} + c(\text{wt}) \end{array} \quad \begin{array}{r} 4825 \text{ tons} = 225 \text{ tons} + 50(\text{weight of each car}) \\ -225 \text{ tons} \quad -225 \text{ tons} \\ \hline \end{array} \quad \begin{array}{r} \frac{4600 \text{ tons}}{50} = \frac{50(\text{weight of car})}{50} \\ \hline 92 \text{ tons} = \text{weight of each car} \end{array}$$

- 5) A car's tank holds 16 gallons of gas. At 1 gallon, you stop at the gas station to refuel. If the car uses 3 gallons per hour, when will you refuel?

$$\begin{array}{r} \text{Fill-up} = \text{total gas} - \text{gas use} \\ \text{let } t = \text{time driving} \\ 1 \text{ gallon} = 16 \text{ gallon} - t \text{ hours}(3 \text{ gallons/hour}) \end{array} \quad \begin{array}{r} 1g = 16g - t(3g) \\ -16g \quad -16g \\ \hline \end{array} \quad \begin{array}{r} \frac{-15g}{-3g} = \frac{-3tg}{-3g} \\ \hline t = 5 \text{ hours} \end{array}$$

- 6) A farmer has \$755. One cow costs \$500 and a flock of chicks costs \$20. If the farmer buys one cow, how many flocks of chicks can he afford to buy?

$$\begin{array}{r} \text{let } c = \# \text{ of cows} \\ f = \# \text{ of flocks of chicks} \\ \text{Farmer's money} \geq \$500c + \$20f \\ (\text{Farmer's money must match or exceed the cost of the cow and chicks}) \end{array} \quad \begin{array}{r} c = 1 \text{ cow} \\ \text{Farmer's money} = \$755 \\ \$755 \geq \$500(1) + \$20f \\ -\$500 \quad -\$500 \\ \hline \end{array} \quad \begin{array}{r} \frac{\$255}{\$20} \geq \frac{\$20f}{\$20} \\ 12.75 \geq f \end{array} \quad \begin{array}{l} \text{since flocks can't be divided, the} \\ \text{farmer can afford 12 flocks of chicks} \end{array}$$

- 7) If 9 friends take a trip, it will cost \$810. However, during the off-season, there is a discount. If it costs the 9 friends \$729, how much was the discount per person?  
(Bonus: What is the percentage discount?)

$$\text{discount/person} = \frac{\text{total discount}}{\text{total persons}} = \frac{\$810 - \$729}{9 \text{ people}} = \frac{\$81}{9 \text{ people}} \quad \text{discount: } \$9/\text{person}$$

\$810 cost for 9 people... then, cost per person: \$90... If the discount is \$9, then the percentage discount is 10%

- 8) The sum of 3 consecutive integers is 234. What is the middle integer?

$$\begin{array}{r} \text{let } n = \text{first integer} \\ n + 1 = \text{second (consecutive) integer} \\ n + 2 = \text{third (consecutive) integer} \end{array} \quad \begin{array}{r} n + (n + 1) + (n + 2) = 234 \\ 3n + 3 = 234 \\ -3 \quad -3 \\ \hline 3n = 231 \\ \frac{3n}{3} = \frac{231}{3} \end{array} \quad \begin{array}{l} n = 77 \\ \text{so, the three integers are} \\ 77, 78, 79 \\ \hline 78 \text{ is the middle integer} \end{array}$$

- 9) The cable company charges \$59.95 per month plus \$4 for each movie rental. If your cable bill is \$111.95, how many movies did you rent?

$$\begin{array}{r} \text{cable bill} = \text{monthly fixed cost} + \$4M \\ \text{where } M = \# \text{ of movies rented} \\ \$111.95 = \$59.95 + \$4M \\ -\$59.95 \quad -\$59.95 \\ \hline 52 = 4M \\ \frac{52}{4} = \frac{4M}{4} \\ 13 = M \end{array} \quad \begin{array}{l} 13 \text{ movies} \end{array}$$

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#### **Word Problems Quadratic MaxMin Application Projectiles**

Quadratic Equations are often used to find maximums and minimums for problems involving projectile motion. For example, you would use a quadratic equation to determine how many seconds would be needed for a ball to reach its maximum height when it was thrown directly upward with an initial velocity of 96 feet per second from a cliff looming 200 feet above a beach.

#### **Algebra Word Problems KET**

COMMUNITY LINK: For a grant application, Jodi is sketching the proposed landscaping plan for a new community center. The plan calls for a rectangular garden. Jodi needs the dimensions of

#### **Word Problems Coin Problems AlgebraLAB**

Coin problems usually involve knowing how many coins and how much money someone has and trying to find out how many of each coin the person has.

#### **Quadratic Applications She Loves Math**

Quadratic Application Problem. Solution. A ball is thrown in the path, measured in feet:  $(y-8=-0.018\{\{\left( \{x-20\} \right)\}^2\})$  What is the maximum height the ball reaches, and how far (horizontally) from Audrey does the ball at its maximum height?

#### **Beginning And Intermediate Algebra Wallaceccfacultyorg**

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#### **Algebra Solving Equations And Inequalities Practice**

Here is a set of practice problems to accompany the Solving Equations and Inequalities chapter of the notes for Paul Dawkins Algebra course at Lamar University.

**Twostep Equation Word Problem Garden Video Khan**

Here's a nifty word problem in which we find the dimensions of a garden given only the perimeter. Let's create an equation to solve!

**Partwhole Ratio Word Problem Video Khan Academy**

Sal solves a tricky ratio word problem. In a language class, the girl to boy ratio is 5 to 8. So for every 5 girls, we have 8 boys.

**Exponential Equations Exponential Growth And Decay**

A decay of 20% is a decay factor of  $1 - 0.20 = 0.80$  A growth of 13% is a growth factor of  $1 + 0.13 = 1.13$  The variable  $x$  represents the number of times the growth/decay factor is multiplied. Let's solve a few exponential growth and decay problems.