

GUIDELINES FOR PROBLEM SOLVING

1. FAMILIARIZE: Understand the problem.

- Read the problem carefully at least twice. In the first reading, get the general overview of the problem. In the second reading, determine exactly what you are being asked to find and what information the problem provides.
- Make a list of the given facts. Determine which are pertinent to solving the problem.
- Determine whether you can substitute smaller or simpler numbers to make the problem more understandable.
- If it will help you organize the information, list the information in a table.
- If possible, make a sketch to illustrate the problem. Label the information given.

2. TRANSLATE: Translate the problem into mathematical language and express the problem in equation form.

- Determine whether there is a formula that can be used to solve the problem.
- Choose a variable to represent one unknown quantity and write down exactly what it represents. If there is more than one unknown, choose the primary unknown to be the quantity which you know the least. Represent other unknown quantities in terms of this same variable.
- Use the information to write an equation that represents the problem. It may be helpful to express the problem in a word equation first.

3. SOLVE: Carry out the mathematical calculations to solve the problem.

4. CHECK: Check the answer obtained in the previous step.

- Ask yourself, “Does this answer make sense?” “Is the answer reasonable?” If the answer is not reasonable, recheck your method for solving the problem and your calculations.
- Check the solution in the original problem, if possible.

5. STATE: State the answer clearly.

- Make sure you have answered the question asked.
- Label your answer with the appropriate units.

WHOLE NUMBER WORD PROBLEMS

1. In retail, the difference between the gross sales and customer returns and allowances is called the net sales. If a store's gross sales were \$2,538 and the customer returns and allowances amounted to \$388, what were the store's net sales?
2. You are installing shelves for your collection of 400 compact discs. If 36 discs fit on each shelf, how many shelves will you need to house your entire collection?
3. You flew from Los Angeles to Miami (2,339 miles), then to New York (1,092 miles), and back to LA (2,451 miles). How many total miles did you fly?
4. While shopping, you decide to buy 3 shirts costing \$19 a piece, a pair of shoes at \$62, and 2 pairs of jeans that are \$49 each. You have \$220 with you. Is that enough money to pay for these purchases?

Answers:

1. \$2,150 in net sales
2. You will need to install 12 shelves.
3. 5,882 miles
4. Yes (if there is no tax)

FRACTION WORD PROBLEMS

1. You are one a grand jury with 23 jurors. Sixteen jurors are needed for a quorum and a vote of 12 jurors is needed to indict.

a. What fraction of the jury is needed to indict?

b. Suppose that only 16 jurors are present. What fraction is needed to indict?

2. A sea otter eats about $\frac{1}{5}$ of its body weight each day. How much will a 35 pound otter eat in a day?

3. You are driving to a town 15 miles away. If you have already driven $3\frac{1}{4}$ miles, how far ways is the town?

4. At a florist's, you buy a dozen roses for your mother. The regular price is \$27 a dozen, but the florist has a "one-third off" sale. How much will you pay for the roses?

Answers:

1. a. $\frac{12}{23}$ b. $\frac{3}{4}$

2. 7 pounds

3. $11\frac{3}{4}$ miles

4. \$18

DECIMAL WORD PROBLEMS

1. Most compact discs are sold in plastic boxes. Suppose that in your CD collection there are 29 boxes that measure 0.4 inches thick and 3 boxes that are 0.94 inches thick. How many inches of shelf space you will need to house this collection?
2. In a chemistry lab, you weigh a compound three times, getting weights of 7.15 grams, 7.18 grams, and 7.23 grams. What is the average of these weights to the nearest hundredth of a gram?
3. Liam has a budget of \$60 a month for his cell phone. For his service, he pays a monthly fee of \$39.95, plus taxes of \$6.65, plus \$0.10 for each text message sent or received. How many text messages can he send or receive and not exceed his budget?
4. On June 5, Gaya rented a Ford Focus with a full tank of gas and 13,741 miles on the odometer. On June 8, she returned the car with 14,131 miles on the odometer. The rental agency charged Gaya \$118 for the rental and needed 13 gallons of gas to fill up the tank. What was the average cost of the rental, in dollars per day?

Answers:

1. 14.42 inches
2. 7.18 grams
3. No more than 134 text messages
4. \$39.33 per day

ALGEBRA WORD PROBLEMS

1. A bowler's final score is the sum of her handicap and scratch score (actual score). If a bowler has a final score of 225 and a handicap of 50, what was her scratch score?

2. Suppose that you weigh 286 lbs. on Jupiter. If this weight is $2\frac{3}{5}$ times your weight on Earth, how much do you weigh on Earth?

3. Stacey's Store charges \$8 less than Maxine's Mart for the same jacket. If the price at Stacey's Store is \$42, what is the price at Maxine's Mart?

4. After finishing college, Nico spent a week touring Italy by bicycle. He biked 260 km from Pisa through Siena to Florence. At Siena, he had biked three times as far from Pisa as he would then bike to Florence. How far had he biked?

Answers:

1. Her scratch score is 175.

2. 110 lbs.

3. \$50

4. 195 km

RATIO AND PROPORTION WORD PROBLEMS

1. If you earn %540 for a 6-day work week, how much do you earn per day?
2. A glacier in Alaska moves about 2 inches in 16 months. How far does the glacier move per month?
3. A bus can travel 150 miles on 10 gallons of gas. How many gallons will it need to travel 225 miles?
4. A blueprint is a scale drawing of a building representing an architect's plans. Ellia is adding 12 get to the length of an apartment and needs to indicate the addition on an existing blueprint. If a 10-ft long bedroom is represented by $2\frac{1}{2}$ inches on the blueprint, how much longer should Ellia make the drawing in order to accurately represent the addition?

Answers:

1. \$90 a day
2. $1\frac{1}{2}$ inches
3. 15 gallons
4. 3 inches

PERCENT WORD PROBLEMS

1. Last year it snowed 70% of the 120 days of ski season. How many days was this?

2. 65 is what percent of 250?

3. What is 23% of 61.2?

4. Five games of a baseball team's 80 games were rained out. What percent of the games were played?

Answers:

1. 84 days

2. 26%

3. 14.076

4. 93.75%

CONVERSION WORD PROBLEMS

1. Your favorite CD plays for 72 minutes. Express this playing time in hours.
2. In a factory, a chemical process produces 3 mg of a special compound each hour. How many grams are produced in 24 hours?
3. *Frankenstein* (130 minutes) and *Dracula* (1 hour 45 minutes) are two classic horror films made in 1931. Which film is longer? How many minutes longer is it?
4. In a recent year, a typical U.S. resident used about 1,699 gallons of water a day for residential, agricultural, and industrial purposes. How many pints did they use?

Answers:

1. 1.2 hours
2. 0.72 grams
3. *Frankenstein* is 25 minutes longer.
4. 13,592 pints