SAMPLE PROBLEMS

(108.) In preparation for the State track championships, Rachel ran four practice laps. Her times were $3\frac{1}{8}$ minutes, $3\frac{1}{6}$ minutes, $3\frac{1}{4}$ minutes, and $2\frac{5}{8}$ minutes.

    a. What was Rachel's total time for the four laps?

    b. What was her average time (in minutes-per-lap) for the four laps?

(131.) Vita Health Farms packs tomatoes in equal-numbered crates. We will agree to let t represent the <u>number of tomatoes in each full crate</u>.
    Write a <u>mathematical</u> expression to represent each of these numbers:

    a. the number of tomatoes in 5 full crates

    b. the total number of tomatoes in 2 full crates, plus 7 extra tomatoes

    c. the number of tomatoes remaining in a full crate after 3 tomatoes were removed

    d. the number of tomatoes remaining from 6 full crates after 2 tomatoes were removed from each

    e. the number of tomatoes that each person would get if 4 full crates were shared equally by 3 people
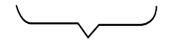

    Don't rush through the class discussion of the problem. Translating verbal descriptions into expressions or equations which include letters to represent unknown quantities, is a fundamental algebraic skill. It must be <u>nurtured</u>.

    Emphasize that each of <u>these</u> verbal descriptions designates a <u>number</u>, <u>not a sentence</u>. (Notice that the word <u>is</u> does not appear in any of the descriptions!) So the numerical representations are <u>expressions</u>, <u>not equations</u>. Students must continually be reminded that the <u>equal sign</u> designates a <u>verb</u>—it can be pronounced "is" or "is the same as" or " is the same amount as".

    Also emphasize the importance of parentheses in expression d, and encourage students to include an explanation of what various quantities represent. Examples:
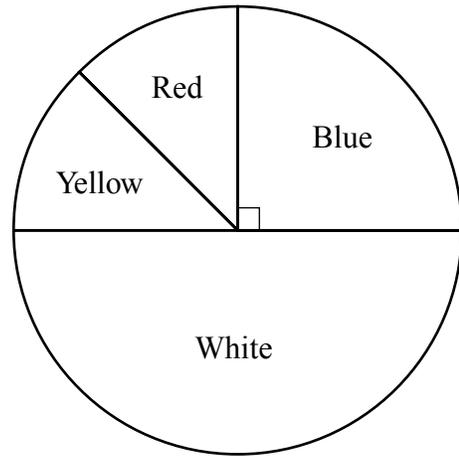
        d. 6 crates $\times$ $(t - 2)$ tomatoes per crate

        e. $4t$ tomatoes $\div$ 3 people
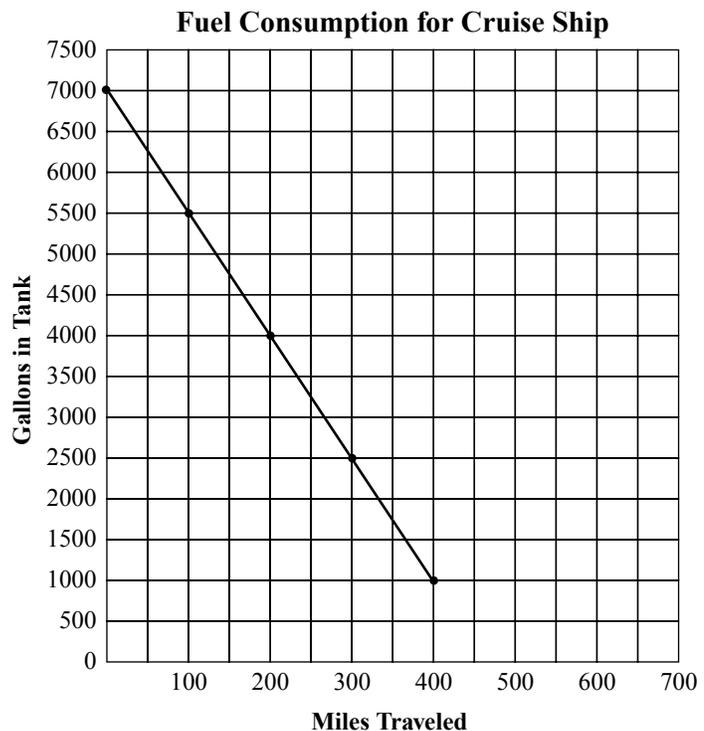
            from 4 full crates

222. **This graph shows the portions of each color that are used to make Autumn Mist Paint. The same amounts of red and yellow are used.**

a. What fraction of Autumn Mist is red? Explain how you know this.

b. For each 100 barrels of Autumn Mist that are made, how many barrels of blue must be used? Explain how you know this.

c. What <u>percent</u> of Autumn Mist is blue?

d. Spectra Paint Co. mixed 365 barrels of red paint with the correct amount of the other colors to make Autumn Mist. How many barrels of paint did they make?

"Recipe" for Autumn Mist

233. a. How many gallons of fuel were in the tank when the cruise began?
Explain how you know this.

b. For each 100 miles that the ship went, how many gallons of fuel were used?

c. The <u>rate</u> at which the ship burned the fuel was
_____ gallons per mile.

d. On this trip, the ship went a total of 400 miles. If it continued to burn fuel at the same rate, how far could it travel on the remaining fuel?

Fuel Consumption for Cruise Ship

133. **Explain how to find these answers <u>mentally</u>:**

    a. Lee rode her bike 700 meters in 6 minutes. At this rate, how far will she ride in a half-hour?

    b. The ratio of red to blue marbles in a bag is 4 to 3. If 15 of the marbles are blue, how many are red?

    c. A pump emptied 75% of a swimming pool in 12 hours. How long will it take to finish emptying the pool?

    d. The ratio of men to women at last years' Super Bowl was 7 to 3. What percent of people at the game were men?

237. **The Elephants are playing the Giraffes for the National Championship. There are 78,500 seats in the Savanna Bowl Stadium. But 87,300 tickets were sold for the big game. So folding bleachers which seat 575 people each are being installed in the end zones. How many of these bleachers are needed?**

141. **Toy World received a shipment of Mutant Warrior King Game Sets. These game sets come packaged in 1-foot cubes, and the cubes are shipped in wooden crates which are 1 yard long, 1 yard wide, and 2 yards high.**
        How many game sets are in a crate?

        (Hint: What is a 1-foot cube? How many <u>feet</u> long is the crate? How many <u>feet</u> wide is it? How many game sets will fit in one layer on the bottom of the crate? How many layers of game sets will fit in the crate?)

247. **Janice is saving money to buy a pair of pearl earrings that cost $78. So far, she has saved $65.**
        On Saturday, the earrings will be on sale for 20% off.
        Does Janice have enough money to buy the earrings on Saturday? If so, how much money will she have left? If not, how much more money would she need? (Disregard sales tax.)

250. Three of these expressions represent the same quantity. The other expression does not.

      i.   2 omelets × (3 eggs + 6 oz. of ham) per omelet

      ii.   3 eggs + 3 eggs + 6 oz. of ham + 6 oz. of ham

      iii. (3 eggs × 6 oz. of ham) + 2 omelets

      iv. (2 omelets × 3 eggs per omelet) + (2 omelets × 6 oz. of ham per omelet)

  a. Circle the expression which does not mean the same thing as the other three.

  b. Complete this story so that the three equivalent expressions each describe the story:
    Joe is a cook at the Muddle House Restaurant. He had an order for

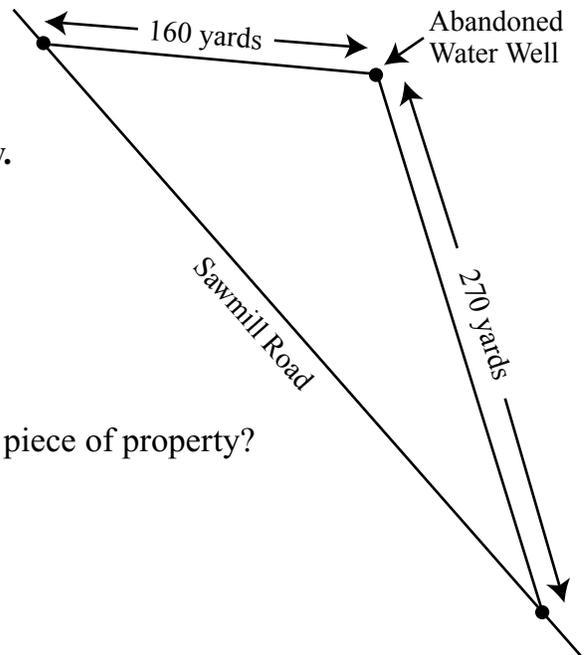_____ omelets. Each omelet is made of _____ eggs and _____ oz. of ham.

Joe used _____ eggs and _____ oz. of ham to fill the order.

267. This is a diagram of a triangular piece of property.
    Eight hundred yards of chain link fencing were required to enclose the property.
    The distance from the abandoned water well to Sawmill Road is 120 yards.

160 yards

Abandoned
Water Well

Sawmill Road

270 yards

  a. What is the area of the property?

  b. An acre is about 5,000 square yards.
      Approximately how many acres is the piece of property?

257. The <u>altitude</u> or <u>elevation</u> of a location in the world represents its relation to a standard called "sea level". Elevations are measured as some distance above or below sea level. For example, Denver, Colorado is called the "mile high city" because it is 1 mile above sea level. The altitude of Denver is 5280 feet.

    a. The elevation of the surface of the <u>Dead Sea is -1290 feet</u>. Do you think this body of water is above or below "sea level"? Explain.

    The elevations of some other locations are given in the chart.

    b. What is the <u>difference</u> in the elevations of Washington, DC and the Great Salt Lake?

    c. What is the <u>difference</u> in the elevations of Sea Level, NC and Knoxville, TN?
Explain how you got our answer.

    d. What is the <u>difference</u> in the elevations of Baton Rouge and New Orleans?
Explain how you got our answer.

    e. What is the <u>difference</u> in the elevations of the Dead Sea and the Marinara Trench?
Explain how you got your answer.

Place	Elevation
Washington, DC	400 ft
Sea Level, NC	0 ft
Baton Rouge	20 ft
Great Salt Lake	4200 ft
Marinara Trench	-36,200 ft
Knoxville, TN	900 ft
Mt. Whitney	14,500 ft
New Orleans	-2 ft
Albany, NY	150 ft

    f. List all of the locations given in this activity (including Denver and the Dead Sea) from the lowest to the highest elevation.