Pennsylvania Grade 8 Open Response Solutions

Standards Categories 2.2 , 2.4 , 2.5, and 2.8

1. Your school is selling two different types of coupon books for the fall fund-raiser. The small coupon book sells for $10.00. The large coupon book sells for $35.00.

A. Your school sold a total of 500 coupon books. The total sales were $7500. How many of each type of book were sold?

B. Your school made a 15% profit on the total sales of the small coupon books and a 25% profit on the total sales of the large coupon books. How much money did your school earn as profit from the fund-raiser?

SOLUTION

A. To find the number of each type of book, set up a system of equations.

Let x = the number of small coupon books sold.
Let y = the number of large coupon books sold.

$$x + y = 500$$
$$10x + 35y = 7500$$

Solve for one of the variables.

$$x = 500 - y$$

Substitute $500 - y$ for x in the second equation.

$$10(500 - y) + 35y = 7500$$
$$5000 - 10y + 35y = 7500$$
$$25y = 2500$$
$$y = 100$$

Substitute the solution back into the original equation.

$$x + y = 500$$
$$x + 100 = 500$$
$$x = 400$$

There were 100 large coupon books sold and 400 small coupon books sold.

B. To find the total amount earned from the sale of the coupon books, find the total amount of sales from each type of book sold. Multiply the sales amount by the percent of profit, and then add the totals.

$$400 \times \$10 = \$4000$$
$$\$4000 \times 0.15 = \$600$$

$$100 \times \$35 = \$3500$$

$3500 × 0.25 = $875

$875 + $600 = $1475

The school earned a profit of $1475 from the fund-raiser.

Correlation: Course 3 Lesson 8-2

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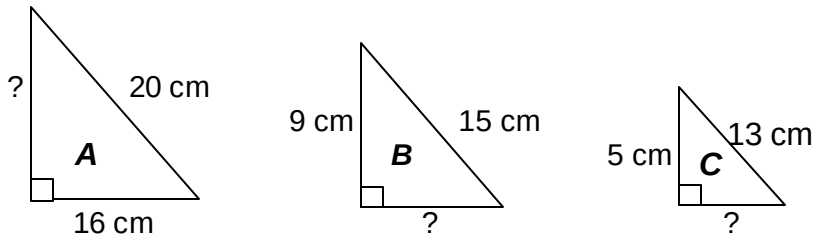
2. Ken drew three right triangles. Two of the triangles are similar.



A. Find the missing side lengths. Which two triangles are similar?

B. Ken needs to draw another right triangle whose hypotenuse measures 30 cm and is similar to the other two similar triangles. Find the lengths of the two legs of this new triangle?

SOLUTION

A. Use the Pythagorean Theorem to find the missing side lengths.

Triangle *A*

$x^2 + 16^2 = 20^2$

$x^2 + 256 = 400$

$x^2 = 144$

$x = 12$ cm

Triangle *B*

$9^2 + x^2 = 15^2$

$81 + x^2 = 225$

$x^2 = 144$

$x = 12$ cm

Triangle *C*

$5^2 + x^2 = 13^2$

$25 + x^2 = 169$

$x^2 = 144$

$x = 12$ cm

Triangles *A* and *B* are similar because their sides are proportional.

$$\frac{9}{12} = \frac{12}{16} = \frac{15}{20}$$

B. Use proportions to find the missing side length.

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$$\frac{9}{15} = \frac{x}{30}$$

$$15x = 270$$

$$x = 18 \text{ cm}$$

$$\frac{12}{15} = \frac{x}{30}$$

$$15x = 360$$

$$x = 24 \text{ cm}$$

To check your work, use the Pythagorean Theorem.

$18^2 + 24^2 = 30^2$

$324 + 576 = 900$

$900 = 900$

Correlation: Course 3, Lessons 6-3 and 7-6

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Standards Categories 2.3 and 2.5

3. Megan wants to build a rectangular swimming pool that has a depth of 6 feet and a perimeter of 36 feet.

A. Using whole numbers, list all the possible dimensions (length and width) for Megan's swimming pool.

B. If Megan decides to reduce the depth of the pool by $\frac{1}{2}$, how will the volume of the pool change?

SOLUTION

A. The possible dimensions of a swimming pool with a depth of 6 ft and a perimeter of 36 ft are as follows:

1 ft × 17 ft

2 ft × 16 ft

3 ft × 15 ft

4 ft × 14 ft

5 ft × 13 ft

6 ft × 12 ft

7 ft × 11 ft

8 ft × 10 ft

9 ft × 9 ft

B. If Megan reduces the depth of the pool by $\frac{1}{2}$, the volume of the pool will decrease by $\frac{1}{2}$, no matter what the set of dimensions are.

Correlation: Course 3, Lessons 6-1 and 6-6