No Bellwork
11/29/2011

1. Simplify $\dfrac{3x^2}{9x}$.

2. Solve $2n = 18 \cdot 32$.

3. Solve $x = \sqrt{36 \cdot 16}$

Geometry
6.1 Ratios, Proportions, and the Geometric Mean
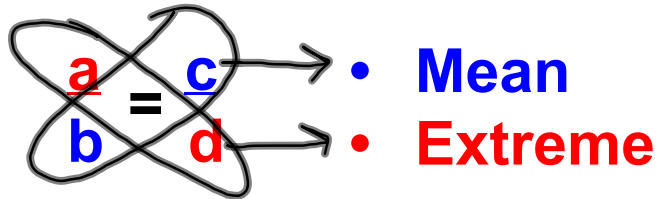## Standard(s): 4,9

Vocabulary:

1. **Ratio of *a* to *b*:** If *a* and *b* are two numbers or quantities and *b*≠0, then the ratio is $\frac{a}{b}$. $a\ to\ b$ $a:b$ $\frac{a}{b}$

2. **Proportion:** An equation that states that two ratios are equal.

$$\frac{a}{b} = \frac{c}{d}$$

3. **Extremes:**

$$\frac{a}{b} = \frac{c}{d}$$

- **Mean**
- **Extreme**

4. **Means:**

5. **Geometric Mean:** The square root of the product of the two numbers.

KEY CONCEPT   *For Your Notebook*

Geometric Mean

The geometric mean of two positive numbers a and b is the positive number x that satisfies $\frac{a}{x} = \frac{x}{b}$. So, $x^2 = ab$ and $x = \sqrt{ab}$.

Geometric Mean: Multiply the numbers and take the square root.

KEY CONCEPT   *For Your Notebook*

A Property of Proportions

1. **Cross Products Property** In a proportion, the product of the extremes equals the product of the means.

If $\frac{a}{b} = \frac{c}{d}$ where $b \neq 0$ and $d \neq 0$, then $ad = bc$.

$$\frac{2}{3} = \frac{4}{6}$$ $3 \cdot 4 = 12$
                                $2 \cdot 6 = 12$

Solve Proportions: Multiply using cross products!

Simplify Ratios

Simplify the ratio.   **NOTE: Find the GCF!**
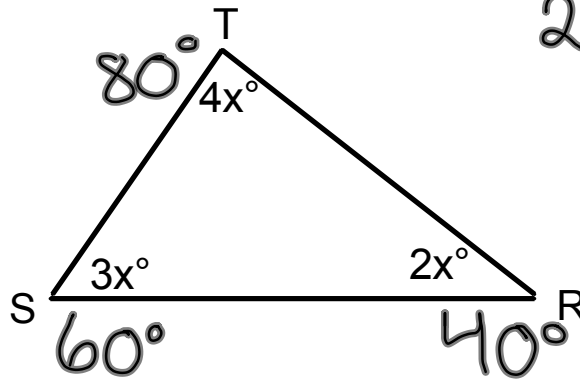
A. 12km:3km

$$\frac{12 \text{ km} \div 3}{3 \text{ km} \div 3}$$

$$\frac{4 \text{ km}}{1 \text{ km}}$$

4km : 1km

B. 36in:9ft

3ft : 9ft

$$\frac{3 \text{ ft}}{9 \text{ ft}}$$

$$\frac{1 \text{ ft}}{3 \text{ ft}}$$

1ft : 3ft

Use Extended Ratios

RST

The measure of the angles of $\triangle$RST are in the extended ratio 2:3:4. Find the measures of the angles.

80°
T
4x°

3x°
S
60°

2x°
R
40°

$2x + 3x + 4x = 180$
$9x = 180$
$x = 20$

Attach a variable to the ratios!

Solve Proportions

Solve the proportion.

A. $\dfrac{2}{x+3} = \dfrac{5}{4x}$

$2 \cdot 4x = 5(x+3)$

$8x = 5x + 15$

$3x = 15$

$x = 5$

B. $\dfrac{6}{x+4} = \dfrac{x-4}{x}$

$6x = (x+4)(x-4)$

$6x = x^2 \underline{-4x + 4x} - 16$

$6x = x^2 - 16$

$\underline{-6x \qquad -6x}$

$0 = x^2 - 6x - 16$

$0 = (x+2)(x-8)$

$x + 2 = 0 \qquad\qquad x - 8 = 0$

$\underline{\;-2\;-2\;} \qquad\qquad \underline{\;+8\;+8\;}$

$\boxed{x = -2} \qquad\qquad \boxed{x = 8}$

Use a Ratio to Find a Dimension and Variables

The area of the rectangle is 108 ft^2, and the ratio of the length to the width is 4:3. Find the length and width of fence needed to enclose the garden.
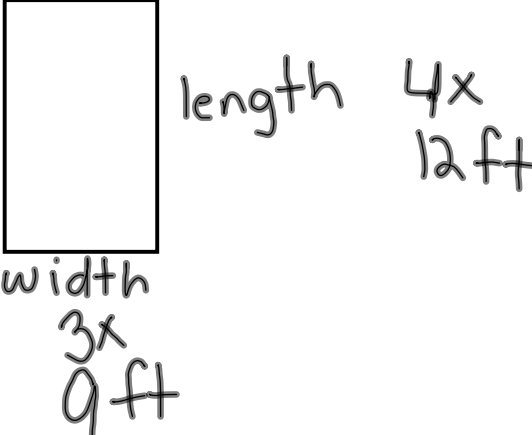
$A = 108 \text{ ft}^2$

$A = \ell \cdot w$

$108 = 4x \cdot 3x$

$12x^2 = 108$

$\frac{12}{12} \quad \frac{108}{12}$
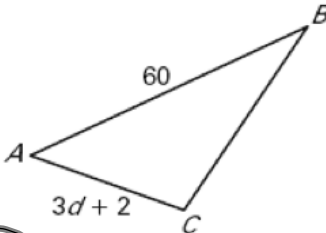
$\sqrt{x^2} = \sqrt{9}$

$x = 3$

length   4x
         12 ft

width
3x
9 ft

The ratio of two side lengths for the triangle is given. Solve for the variable.

$\dfrac{AB}{AC} = \dfrac{15}{8}$ $AB : AC$ is $15 : 8$

$\dfrac{60}{3d+2} = \dfrac{15}{8}$

60

A

3d + 2   C

B

$480 = 15(3d+2)$

$480 = 45d + 30$

$450 = 45d$

$d = 10$

Find a Geometric Mean

Find the geometric mean of the two numbers. Write the answer in simplest radical form (no decimals).

NOTE: Multiply the numbers, then take the square root!

A. 18 and 54

$$18 \cdot 54$$

$$\sqrt{972}$$

$$\sqrt{324} \cdot \sqrt{3}$$

$$18\sqrt{3}$$

B. 16 and 18

$$\sqrt{288}$$

$$\sqrt{144} \cdot \sqrt{2}$$

$$12\sqrt{2}$$

Homework Assignment

Worksheet 6.1B