

Notes for Lesson 8-1: Similarity in Right Triangles

We will start this lesson with a review of a concept you learned in Algebra II. Below, you will find some examples and step by step instructions to remind you how to simplify square roots. Read these instructions and look at the examples to attempt the problems at the bottom of the page.

Example 1:

Simplify $\sqrt{128}$

Step 1: Think of the biggest perfect square number that divides evenly into the number under the root. In this example it is 64 since $2 \cdot 64 = 128$.

Step 2: take the square root of your number from step 1 and put that number in front of the root sign. Leave the other number under the root.

$$8\sqrt{2}$$

Example 2:

Simplify $\sqrt{200} = \sqrt{100 \cdot 2} = 10\sqrt{2}$

Perfect
Squares

4
9
16
25
36
49
64
81
100
121
144
169
196
225

Now try to simplify the following roots:

$$1) \sqrt{28} = \sqrt{4 \cdot 7} = 2\sqrt{7}$$

$$2) \sqrt{600} = \sqrt{100 \cdot 6} = 10\sqrt{6}$$

$$3) \sqrt{98} = \sqrt{49 \cdot 2} = 7\sqrt{2}$$

$$4) 2\sqrt{192} = 2\sqrt{64 \cdot 3} = 2 \cdot 8\sqrt{3} = 16\sqrt{3}$$

$$5) 3\sqrt{32} = 3\sqrt{16 \cdot 2} = 12\sqrt{2}$$

$$6) \sqrt{\frac{9}{25}} = \frac{\sqrt{9}}{\sqrt{25}} = \frac{3}{5}$$

$$7) \sqrt{\frac{16}{5}} = \frac{\sqrt{16}}{\sqrt{5}} = \frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}}{\sqrt{25}} = \frac{4\sqrt{5}}{5}$$

$$8) \frac{\sqrt{24}}{2\sqrt{3}} = \frac{\sqrt{4 \cdot 6}}{2\sqrt{3}} = \frac{2\sqrt{6}}{2\sqrt{3}} = \sqrt{\frac{6}{3}} = \sqrt{2}$$

In lesson 8-1, the first new concept is the idea of a Geometric Mean. To calculate this mean we must use a proportion. Look at the following example and steps then complete the problems below.

Example 1:

Find the geometric mean between 5 and 11

Step 1: Set up a proportion with the two given numbers on a diagonal.

$$\frac{5}{x} = \frac{x}{11}$$

Step 2: Put x's in the two empty spaces of the proportion.

$$\frac{5}{x} = \frac{x}{11}$$

Step 3: Cross multiply and solve

$$x^2 = 55$$

$$x = \sqrt{55}$$

Since this root cannot be simplified we can leave the answer the way it is.

Find the geometric means of the following pairs of numbers. Simplify your roots when possible.

1) 2 and 3

$$\frac{2}{x} = \frac{x}{3}$$

$$\sqrt{x^2} = \sqrt{6}$$

$$x = \sqrt{6}$$

2) 2 and 6

$$\frac{2}{x} = \frac{x}{6}$$

$$\sqrt{x^2} = \sqrt{12}$$

$$x = 2\sqrt{3}$$

3) 2 and 5

$$2 \cdot 5 = 10$$

4) 2 and 18

$$3\sqrt{4} = 6$$

5) 49 and 25

6) 16 and 24