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LEARNING OBJECTIVE: We will simplify square roots. (Lesson 70)

ACTIVATING PRIOR KNOWLEDGE:

How do we know that $\sqrt{36} = 6$?	How do we know that $\sqrt{16} = 4$?
because $6 \times 6 = 36$ 36 is a perfect square Taking the square root of any perfect square results in an integer. $\sqrt{6^2} = 6$	4×4 16 is perfect square.

CONCEPT DEVELOPMENT:

Multiplication Property of Square Roots:

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

Examples:

$\sqrt{56} = \sqrt{8 \cdot 7} = \sqrt{8} \cdot \sqrt{7}$

$\sqrt{124} = \sqrt{4} \cdot \sqrt{31}$
$= 2\sqrt{31}$

$\sqrt{36} = 6$

$\sqrt{36} = \sqrt{4} \cdot \sqrt{9}$
$2 \cdot 3 = 6$

$\boxed{\sqrt{5} \cdot \sqrt{6} = \sqrt{30}}$

Remember this important item:

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

Example: $\sqrt{144} = \sqrt{12^2} = 12$

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Guided Practice:

Steps for Simplifying Square Roots

1. Look at the number in the radical sign. Is it a perfect square? No.
2. If not a perfect square, can we rewrite the number as a factor of other numbers, looking for perfect squares (i.e. 4, 9, 16, 25, etc.)
3. Rewrite the square root as a product of its factors.
4. Simplify the perfect squares.

$\sqrt{16}\cdot\sqrt{3}$ $\boxed{4\sqrt{3}}$ $\sqrt{48}$ $\sqrt{4}\cdot\sqrt{12}$ $2\sqrt{12}$ $2\cdot\sqrt{4}\cdot\sqrt{3}$ $2\cdot 2\cdot\sqrt{3}$ $\boxed{4\sqrt{3}}$ "Four Root Three"	$\sqrt{4}\cdot\sqrt{54}$ $2\cdot\sqrt{9}\cdot\sqrt{6}$ $2\cdot 3\cdot\sqrt{6}$ $\boxed{6\sqrt{6}}$ $\sqrt{216}$ * $\sqrt{36}\cdot\sqrt{6}$ $\boxed{6\sqrt{6}}$ $\sqrt{2}\cdot\sqrt{108}$ $\sqrt{2}\cdot\sqrt{2}\cdot\sqrt{54}$ 2 $\sqrt{9}\cdot\sqrt{24}$ $3\sqrt{24}$ $3\sqrt{4}\cdot\sqrt{6}$ $3\cdot 2\sqrt{6}$ $\boxed{6\sqrt{6}}$
$\sqrt{2}\cdot\sqrt{54}$ $\sqrt{2}\cdot\sqrt{2}\cdot\sqrt{27}$ $2\sqrt{27}$ $\sqrt{108}$ $\sqrt{4}\cdot\sqrt{27}$ $\sqrt{4}\cdot\sqrt{9}\cdot\sqrt{3}$ $2\cdot 3\cdot\sqrt{3}$ $\boxed{6\sqrt{3}}$ $\sqrt{9}\cdot\sqrt{12}$ $3\cdot\sqrt{4}\cdot\sqrt{3}$ $3\cdot 2\cdot\sqrt{3}$ $6\sqrt{3}$	$\sqrt{100}\cdot\sqrt{20}$ $\sqrt{4}\cdot\sqrt{25}\cdot\sqrt{4}\cdot\sqrt{5}$ $4\cdot 5\cdot\sqrt{5}$ $20\sqrt{5}$ $\sqrt{2000}$ $\sqrt{25}\cdot\sqrt{80}$ $5\sqrt{4}\cdot\sqrt{20}$ $5\cdot 2\sqrt{20}$ $10\sqrt{4}\cdot\sqrt{5}$ $20\sqrt{5}$ $\sqrt{2000}$ * $\sqrt{2}\cdot\sqrt{1000}$ $\sqrt{2}\cdot\sqrt{100}\cdot\sqrt{10}$ $10\sqrt{2}\cdot\sqrt{10}$ $10\sqrt{2}\cdot\sqrt{2}\cdot\sqrt{5}$ $10\cdot 2\cdot\sqrt{5}$ $\boxed{20\sqrt{5}}$
$\sqrt{475}$ $\sqrt{25}\cdot\sqrt{19}$ $5\sqrt{19}$	$\sqrt{10}\cdot\sqrt{125}$ $\sqrt{10}\cdot\sqrt{25}\cdot\sqrt{5}$ $\sqrt{5}\cdot\sqrt{2}\cdot 5\cdot\sqrt{5}$ $5\cdot 5\cdot\sqrt{2}$ $\boxed{25\sqrt{2}}$ $\sqrt{1250}$ $\sqrt{25}\cdot\sqrt{50}$ $\sqrt{25}\cdot\sqrt{25}\cdot\sqrt{2}$ $\boxed{25\sqrt{2}}$ 25 1.4 35

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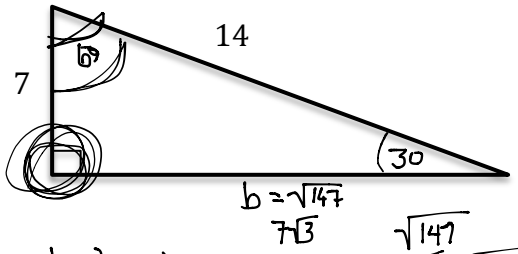
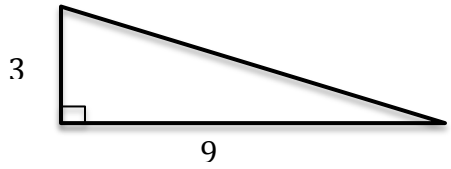
Solve 2 different ways $\sqrt{256}$	Solve 2 different ways $\sqrt{1024}$
Solve 2 different ways $\sqrt{288}$	Solve 2 different ways $\sqrt{1152}$
Find the unknown side length. Simplify your answer!  $b = \sqrt{147}$ $7\sqrt{3}$ $\sqrt{147}$ $\sqrt{3} \cdot \sqrt{49}$ $7^2 + b^2 = 14^2$ $49 + b^2 = 196$ $b^2 = \frac{-49}{147}$	Find the unknown side length. Simplify your answer! 

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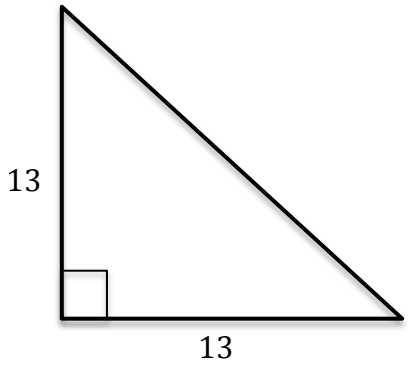
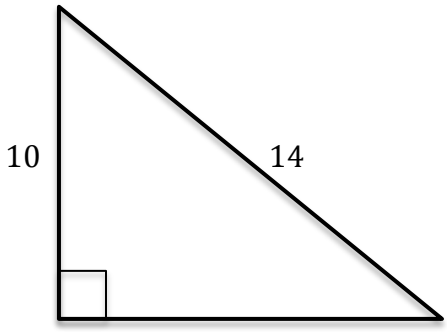
Independent Practice:

Simplify as much as possible: $\sqrt{1800}$	Simplify as much as possible: $\sqrt{660}$
Simplify as much as possible: $\sqrt{45} \cdot \sqrt{20}$	Simplify as much as possible: $\sqrt{24} \cdot \sqrt{3} \cdot \sqrt{2}$
Find the missing side length: 	Find the missing side length: 

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Closure:

Simplify $\sqrt{2420}$

Notes:

This maps to Lesson 4, module 7, grade 8.
Homework is Pythagorean theorem on Khan Academy, and simplifying radicals 1 and 2 on Khan academy