NAME:_____ Math _____, Period _____

Mr. Rogove Date:_____

LEARNING OBJECTIVE: We will simplify square roots. (G8M7L4)

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 RESULTS AN INTEGER	Because $4 \times 4 = 16$ 16 is a perfect square ANY PERFECT SQUARE

CONCEPT DEVELOPMENT:

Multiplication Property of Square Roots:

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

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

Examples:

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

$\sqrt{2^3} \cdot \sqrt{7}$

$\sqrt{28} \cdot \sqrt{2} = \sqrt{8} \cdot \sqrt{7}$

$\sqrt{14} \cdot \sqrt{4}$

$2\sqrt{14}$

$\sqrt{36} = \sqrt{6} \cdot \sqrt{6}$

$= (\sqrt{6})^2$

$= 6$

$\sqrt{12} \cdot \sqrt{3}$

$\sqrt{4} \cdot \sqrt{3} \cdot \sqrt{3}$

$2 \cdot 3 = 6$

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

$\sqrt{40} = \sqrt{5} \cdot \sqrt{8}$

$\sqrt{5} \cdot \sqrt{4} \cdot \sqrt{2} = 2\sqrt{10}$

Remember this important item:

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

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

$\sqrt{36} = \sqrt{6^2} = 6$

$(\sqrt{6})^2 = \sqrt{6} \cdot \sqrt{6}$

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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?
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.

$\sqrt{48}$

Does 4 go into 48?

$\sqrt{4} \cdot \sqrt{12}$

Does 4 go into 12?

$\sqrt{4} \cdot \sqrt{4} \cdot \sqrt{3}$

$2 \cdot 2 \cdot \sqrt{3}$

$4\sqrt{3}$

"4 times sq. root of 3"

"4 root 3"

$\sqrt{216}$

Does 4 go into 216? $\sqrt{4} \cdot \sqrt{54}$

Does 4 go into 54? $2\sqrt{54}$

Does 9 go into 54? $2\sqrt{9} \cdot \sqrt{6}$

$2 \cdot 3\sqrt{6}$

$6\sqrt{6}$

WHITE BOARDS

$\sqrt{216}$

$\sqrt{2} \cdot \sqrt{108}$

$\sqrt{2} \cdot \sqrt{2} \cdot \sqrt{54}$

$\sqrt{2} \cdot \sqrt{2} \cdot \sqrt{6} \cdot \sqrt{9}$

$\sqrt{2} \cdot \sqrt{2} \cdot \sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3}$

$2\sqrt{2} \cdot 3\sqrt{3}$

$6\sqrt{6}$

$\sqrt{108}$

$\sqrt{4} \cdot \sqrt{27}$

$\sqrt{4} \cdot \sqrt{9} \cdot \sqrt{3}$

$2 \cdot 3 \cdot \sqrt{3}$

$6\sqrt{3}$

$\sqrt{36} \cdot \sqrt{3}$

$6\sqrt{3}$

$\sqrt{2000}$

$\sqrt{4} \cdot \sqrt{5} \cdot \sqrt{100}$

$2\sqrt{5} \cdot 10$

$20\sqrt{5}$

WHITE BOARDS

$\sqrt{4} \cdot \sqrt{500}$

$\sqrt{4} \cdot \sqrt{20} \cdot \sqrt{25}$

$\sqrt{4} \cdot \sqrt{4} \cdot \sqrt{5} \cdot 5$

$2 \cdot 2 \cdot 5 \cdot \sqrt{5}$

$20\sqrt{5}$

$\sqrt{475}$

$\sqrt{25} \cdot \sqrt{19}$

$\sqrt{5^2} \cdot \sqrt{19}$

$5\sqrt{19}$

$\sqrt{1250}$

$\sqrt{25} \cdot \sqrt{50}$

$\sqrt{25} \cdot \sqrt{25} \cdot \sqrt{2}$

$(\sqrt{25})^2 \cdot \sqrt{2}$

$25\sqrt{2}$

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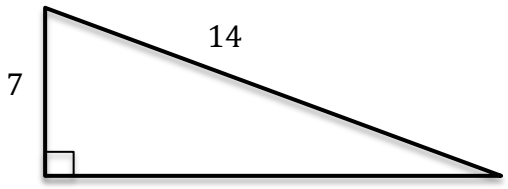
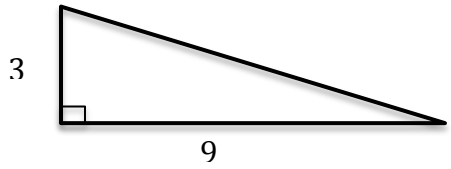
Solve 2 different ways $\sqrt{256}$ $\sqrt{16^2}$ $\sqrt{16}\cdot\sqrt{16}=16$ 16 $\sqrt{64}\cdot\sqrt{4}$ $8\cdot 2=16$ $(\sqrt{2}\cdot\sqrt{2})(\sqrt{2}\cdot\sqrt{2})(\sqrt{2}\cdot\sqrt{2})(\sqrt{2}\cdot\sqrt{2})$ $2\quad 2\quad 2\quad 2 = 16$	Solve 2 different ways $\sqrt{1024}$
Solve 2 different ways $\sqrt{288}$	Solve 2 different ways $\sqrt{1152}$
Find the unknown side length. Simplify your answer!  	Find the unknown side length. Simplify your answer! 

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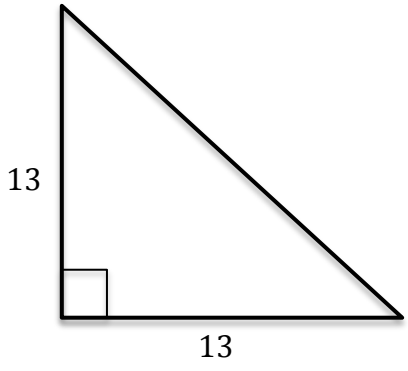
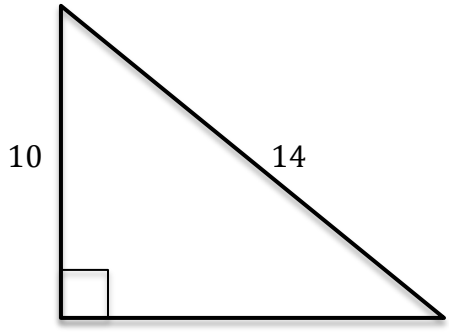
Independent Practice:

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

Can be optional for math 8 students.