

Square Roots

adding same root \rightarrow treat the root like a variable.

$$\text{Ex } 3\sqrt{7} + 6\sqrt{7} = 9\sqrt{7}$$

$$3x + 6x = 9x \quad (\text{example})$$

$$3\sqrt{7} + 4\sqrt{11} - 2\sqrt{7} \quad \sqrt{7} + 4\sqrt{11}$$

$$3x + 4y - 2x = x + 4y$$

you do:

$$\frac{4\sqrt{15} + 7\sqrt{15}}{11\sqrt{15}}$$

$$\frac{7\sqrt{7} + 7\sqrt{16}}{7\sqrt{7} + 7\sqrt{16}}$$

$$\frac{6\sqrt{17} - 5\sqrt{17}}{\sqrt{17}}$$

multiply \rightarrow multiply outsides, mult. insides

$$\text{Ex } 5\sqrt{5} \cdot 3\sqrt{6}$$

$$\frac{5 \cdot 3 \cdot \sqrt{5} \cdot \sqrt{6}}{15 \sqrt{30}}$$

reduce
if possible

$$7\sqrt{3} \cdot 2\sqrt{6}$$

$$14\sqrt{18}$$

$$\boxed{42\sqrt{2}}$$

$$\begin{array}{c} \uparrow \\ 2 \cdot 9 \\ \textcircled{3 \cdot 3} \end{array}$$

$$14 \cdot 3\sqrt{2}$$

$$4\sqrt{7} \cdot 3\sqrt{6}$$

$$12\sqrt{42}$$

$$2\sqrt{6} \cdot 5\sqrt{6}$$

$$10\sqrt{36}$$

$$10 \cdot 6$$

$$10(\sqrt{6})^2$$

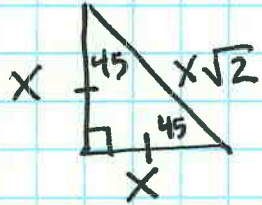
$$10 \cdot 6$$

$$5\sqrt{5} \cdot 6\sqrt{7}$$

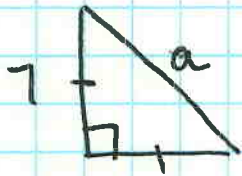
$$30\sqrt{35}$$

Special Right Triangles

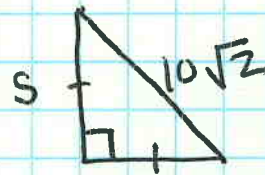
45-45-90 only works for 45°-45°-90° Δ



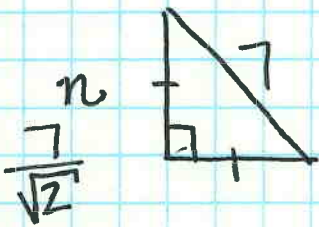
2 legs equal the length $\times \sqrt{2}$



$$a = 7\sqrt{2}$$



$$s = 10$$

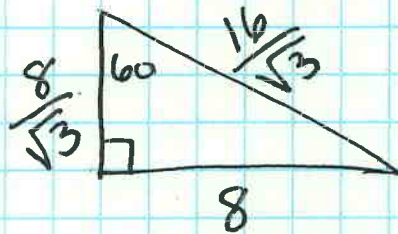
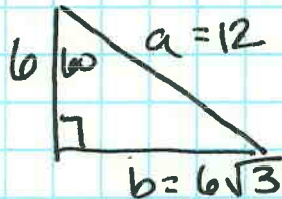
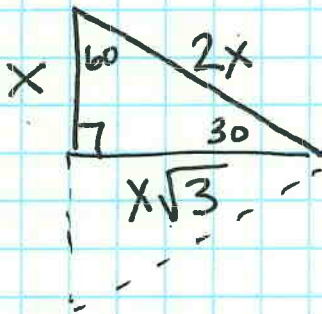


set hyp = $x\sqrt{2}$

$$\frac{7}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

30-60-90

1 · 2 · 3
 $x \cdot 2x \cdot x\sqrt{3}$

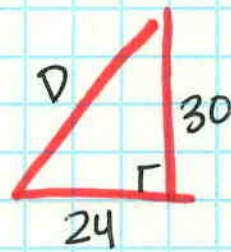
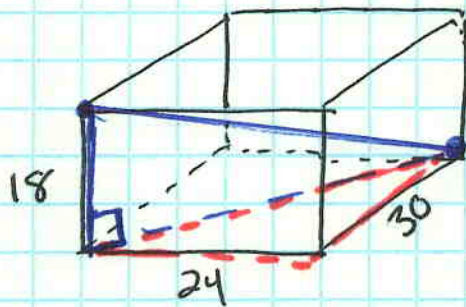


$$\frac{8}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}} \quad x = \frac{8}{\sqrt{3}}$$

Story Problem

What is the biggest stick
that will fit into a box

$$24'' \times 30'' \times 18''?$$



498: 1, 4

509: $\underbrace{1, 2, 5, 7, 14, 16}_{\text{plain}}, \underbrace{1, 2, 4}_{\text{sp. RTA}}$

Red Δ

$$D^2 = 24^2 + 30^2$$

BLUE Δ

$$L^2 = 18^2 + D^2$$

substitution

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

$$L^2 = 1800$$

$$L = \sqrt{1800} = 30\sqrt{2}$$

$L \approx 42.4''$