9.2 Investigating Square Roots

b is the square root of a if $b^2 = a$

$\sqrt{4} = 2$

$\sqrt{}$ = radical

Radical Rules

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

$\sqrt{50} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$

Simplifying Square roots without calculators

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

$\sqrt{175} = \sqrt{25} \cdot \sqrt{7} = 5\sqrt{7}$

Products

$a\sqrt{c} \cdot b\sqrt{d}$

$a \cdot b \cdot \sqrt{c \cdot d}$

$3\sqrt{5} \cdot 2\sqrt{10}$

$6\sqrt{50}$

$6\sqrt{25 \cdot 2}$

$6 \cdot 5\sqrt{2}$

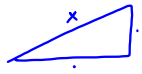
$30\sqrt{2}$

$\frac{10\sqrt{8}}{3\sqrt{2}} = \frac{10\sqrt{4 \cdot 2}}{3\sqrt{2}} = \frac{10 \cdot 2\sqrt{2}}{3\sqrt{2}} = \frac{20}{3}$

Solving Square Roots

$\sqrt{x^2} = \sqrt{50}$

$x = \pm 5\sqrt{2}$



When you square root a square the answer will be $\pm$

$$\frac{5x^2}{5} = \frac{315}{5}$$

$$\sqrt{x^2} = \sqrt{63}$$

$$x = \pm\sqrt{63}$$

$$x = \pm\sqrt{9 \cdot 7}$$

$$x = \pm 3\sqrt{7}$$

$$x^2 = (4c)^2 + (2c)^2$$

$$x^2 = 16c^2 + 4c^2$$

$$\sqrt{x^2} = \sqrt{20c^2}$$

$$x = \pm\sqrt{5 \cdot 4 \cdot c^2}$$

$$x = \pm 2c\sqrt{5}$$