3.) $11a^2 - 44 = 0$

$11(a^2 - 4) = 0$

$(11)(a-2)(a+2) = 0$

$a = \mp 2$

53.) $2x^2 - 4x - 8 = -x^2 + x$

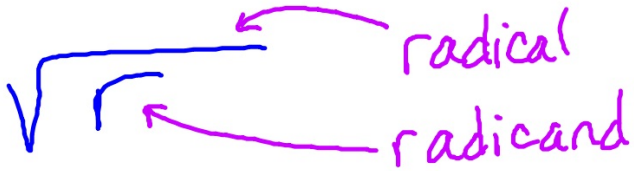
$3x^2 - 5x - 8 = 0$

$(3x - 8)(x + 1) = 0$

$x = -1, \frac{8}{3}$

1.5: Solving quadratic equations with square roots method

Parts of a square root




$\sqrt{9+4} \neq 3+2$

Properties

1. $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$
2. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

No property for $\sqrt{a+b}$ or $\sqrt{a-b}$

Simplifying: a radical is fully simplified when:

1) no radicand has a perfect square factor other than 1

2) there is no radical in the denominator

Simplify

a.) $\sqrt{12}$

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

$2\sqrt{3}$

$\sqrt{12}$

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

$2\sqrt{3}$

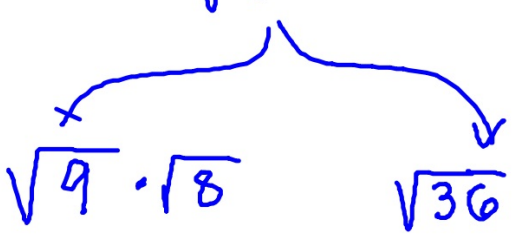
"2 of a kind"

b) $\sqrt{500}$

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

$10\sqrt{5}$

c.) $\sqrt{72}$



$\sqrt{9} \cdot \sqrt{8}$

$3\sqrt{8}$

$3\sqrt{4} \cdot \sqrt{2}$

$3 \cdot 2\sqrt{2}$

$6\sqrt{2}$

$\sqrt{36} \cdot \sqrt{2}$

$6\sqrt{2}$

d.) $\sqrt{\frac{9}{64}}$

$\frac{\sqrt{9}}{\sqrt{64}}$

$\frac{3}{8}$

e.) $\sqrt{10} \cdot \sqrt{15}$

$\sqrt{150}$

$\sqrt{25} \cdot \sqrt{6}$

$5\sqrt{6}$

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

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

$5\sqrt{6}$

f.) $\sqrt{\frac{13}{2}}$

mult. by 1 $\frac{\sqrt{13}}{\sqrt{2}} \cdot \left(\frac{\sqrt{2}}{\sqrt{2}}\right)$

$\frac{\sqrt{26}}{2}$

g.) $\frac{12}{\sqrt{6}} \frac{\sqrt{6}}{\sqrt{6}}$

$\frac{12\sqrt{6}}{6}$

$2\sqrt{6}$

h.) $\frac{7}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{7\sqrt{3}}{6}$

i.) $\sqrt{\frac{5}{18}}$

$\frac{\sqrt{5}}{\sqrt{18}} = \frac{\sqrt{5}}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{\sqrt{10}}{6}$

Square Root Method

**This is an alternative way to solve when there is a quadratic of the form:**

$$ax^2 + c = 0 \quad \text{or} \quad a(x - h)^2 + c = 0$$

do not FOIL!

**Solve the equation.**

**1) $x^2 = 49$**

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

(1) Isolate $x^2$ or $(x-h)^2$

(2) Take the square root of both sides

2) $7(m + 3)^2 - 10 = 25$

$+10 \quad +10$

$7(m+3)^2 = 35$

$\sqrt{(m+3)^2} = \sqrt{5}$

$m + 3 = \pm\sqrt{5}$

$-3 \quad -3$

$m = -3 \pm \sqrt{5}$

5.) $(x-3)^2 - 4 = 20$

$\sqrt{(x-3)^2} = \sqrt{24}$

$x - 3 = \pm\sqrt{24}$

$x = 3 \pm \sqrt{24}$

$x = 3 \pm 2\sqrt{6}$

4.) $3x^2 - 1 = 0$

$\sqrt{x^2} = \sqrt{\frac{1}{3}}$

$x = \pm \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

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

**5) Find the zeros: $y = 7(x - 4)^2 - 28$**

$0 = 7(x-4)^2 - 28$

$28 = 7(x-4)^2$

$4 = (x-4)^2$

$\sqrt{(x-4)^2} = \sqrt{4}$

$x - 4 = \pm 2$

$x = 4 \pm 2$

$4+2 \qquad 4-2$

$x = 2, 6$

#15, 17 : refer to p.33 example 2b

6.) $3x^2 - 8 = -8$

$\frac{3x^2}{3} = \frac{0}{3}$

$\sqrt{x^2} = \sqrt{0}$

~~$\pm 0$~~

$x = 0$, multiplicity of 2