

$$\sqrt[2]{\sqrt[3]{\sqrt[4]{x}}} = \left(\left(x^{\frac{1}{4}} \right)^{\frac{1}{3}} \right)^{\frac{1}{2}} = x^{\frac{1}{24}} = \sqrt[24]{x}$$

$$2 \cdot 3 \cdot 4 = 24 \sqrt{x}$$

Nov 9, 2012

Section 8.1

Solving Quadratic Equations

- ① Factoring
- ② Square root method
- ③ Completing the square

Factoring

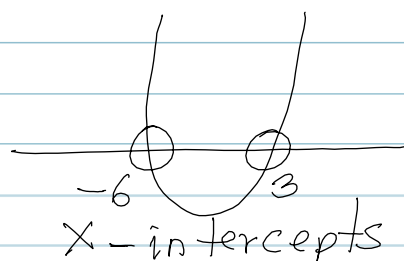
- ① Set to zero
- ② Factor
- ③ Set each factor to zero

Example

$$\begin{aligned}x^2 + 3x &= 18 \\x^2 + 3x - 18 &= 0 \\(x+6)(x-3) &= 0 \\~~x+6~~ & \quad ~~x-3~~\end{aligned}$$

$$\begin{aligned}x+6 &= 0 \\x &= -6\end{aligned}$$

$$\begin{aligned}x-3 &= 0 \\x &= 3\end{aligned}$$



Nov 9, 2012

Square root Method

$$* x^2 = 9$$

$$x = \pm 3$$

$$* x^2 - 9 = 0$$

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

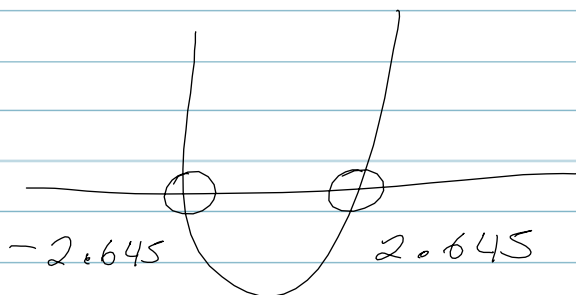
$$\boxed{x = -3} \quad \boxed{x = 3}$$

$$* x^2 = \pm \sqrt{9}$$
$$= \pm 3$$

$$* x^2 = 7$$
$$x = \pm \sqrt{7}$$

$$+\sqrt{7} \quad -\sqrt{7}$$

$$+2.645 \quad -2.645$$



$$* x^2 = 24$$

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

$$* 3(x-2)^2 - 6 = 0$$
$$3(x-2)(x-2) - 6 = 0$$
$$3(x^2 - 4x + 4) - 6 = 0$$
$$3x^2 - 12x + 12 - 6 = 0$$
$$3x^2 - 12x + 6 = 0$$

factor this

$$3(x^2 - 4x + 2) = 0$$
$$3(\quad) =$$

doesn't Factor

Nov 9, 2012

$$3(x-2)^2 = 6 = 0$$

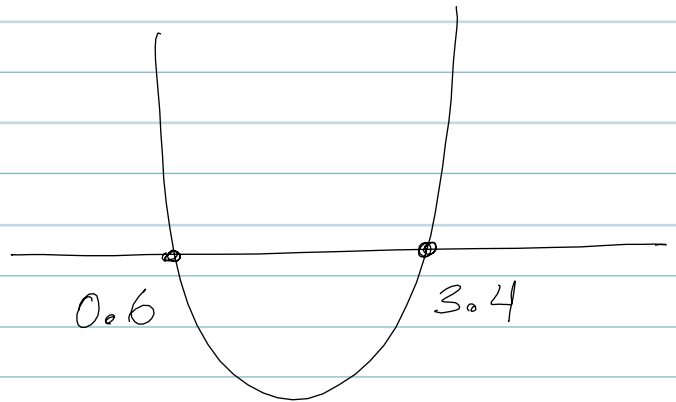
$$3(x-2)^2 = 6$$

$$\frac{3(x-2)^2}{3} = \frac{6}{3}$$

$$(x-2)^2 = 2$$

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

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



$$2 + \sqrt{2}$$

$$2 - \sqrt{2}$$

$$2 + 1.4$$

$$2 - 1.4$$

$$3.4$$

$$0.6$$

Completing the Square

$$(x+3)^2 = (x+3)(x+3)$$

$$= x^2 + 3x + 3x + 9$$

$$= x^2 + 2(3x) + 9$$

$$= x^2 + 6x + 9$$

$$(x-2)^2 = (x-2)(x-2)$$

$$= x^2 - 2x - 2x + 4$$

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

=

Nov 9, 2012

$$\textcircled{1} x^2 + 8x + \underline{16} = (x+4)(x+4) = (x+4)^2$$

$$x^2 + \underline{4x} + 4x$$

$$\left(\frac{8}{2}\right)^2 = (4)^2 = 16$$

$$\textcircled{2} x^2 - 16x + \underline{64} = (x-8)(x-8) = (x-8)^2$$

$$\left(\frac{-16}{2}\right)^2 = (-8)^2 = 64$$

$$\textcircled{3} x^2 + 24x + \underline{144} = (x+12)(x+12) = (x+12)^2$$

$$\left(\frac{24}{2}\right)^2 = (\underline{12})^2 = 144$$

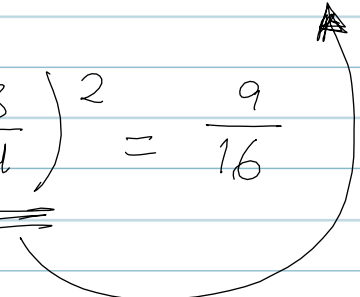
$$\textcircled{4} x^2 + 5x + \underline{\frac{25}{4}} = \left(x + \frac{5}{2}\right)^2$$

$$\left(\frac{5}{2}\right)^2 = \frac{25}{4}$$

Nov 9, 2012

⑤

$$x^2 + \frac{3}{2}x + \frac{9}{16} = \left(x + \frac{3}{4}\right)^2$$

$$\left(\frac{3}{2}\right)^2 = \left(\frac{3}{2} \cdot \frac{1}{2}\right)^2 = \left(\frac{3}{4}\right)^2 = \frac{9}{16}$$


⑥

$$x^2 + 4x - 7 = 0$$

$$x^2 + 4x + \underline{4} = 7 + \underline{4}$$

$$\left(\frac{4}{2}\right)^2 = (2)^2 = 4$$

$$(x+2)^2 = 11$$

$$x+2 = \pm\sqrt{11}$$

$$\boxed{x = -2 \pm \sqrt{11}}$$

7

$$3x^2 + 7x - 1 = 0$$

$$\frac{3x^2}{3} + \frac{7x}{3} - \frac{1}{3} = \frac{0}{3}$$

$$x^2 + \frac{7}{3}x - \frac{1}{3} = 0$$

$$x^2 + \frac{7}{3}x + \frac{49}{36} = \frac{1}{3} + \frac{49}{36}$$

$$\left(\frac{7}{3} \cdot \frac{1}{2}\right)^2 = \left(\frac{7}{6}\right)^2 = \frac{49}{36}$$

$$\left(x + \frac{7}{6}\right)^2 = \frac{12}{36} + \frac{49}{36}$$

$$\left(x + \frac{7}{6}\right)^2 = \frac{61}{36}$$

$$x + \frac{7}{6} = \pm \sqrt{\frac{61}{36}} = \pm \frac{\sqrt{61}}{6}$$

$$x + \frac{7}{6} = \pm \frac{\sqrt{61}}{6}$$

$$x = \frac{-7}{6} \pm \frac{\sqrt{61}}{6} = \frac{-7 \pm \sqrt{61}}{6}$$

Section 8.1 Review / p 's November 12, 2012
+HW

$$1) \frac{9p^2}{9} - \frac{12p}{9} - \frac{2}{9} = 0$$

$$p^2 - \frac{4}{3}p - \frac{2}{9} = 0$$

$$p^2 - \frac{4}{3}p + \left[\frac{4}{9}\right] = \frac{2}{9} + \left[\frac{4}{9}\right]$$

$$\left(\frac{-4}{3}, \frac{1}{2}\right)^2 = \left(\frac{-2}{3}\right)^2 = \frac{4}{9}$$

$$\left(p - \frac{2}{3}\right)^2 = \frac{2}{9} + \frac{4}{9} = \frac{6}{9} \text{ or } \left(p - \frac{2}{3}\right)^2 = \frac{2}{3}$$

$$p - \frac{2}{3} = \pm \sqrt{\frac{6}{9}}$$

$$p - \frac{2}{3} = \pm \sqrt{\frac{2}{3}}$$

$$p - \frac{2}{3} = \pm \sqrt{\frac{6}{9}} \quad \frac{\sqrt{6}}{3}$$

$$p = \frac{2}{3} \pm \sqrt{\frac{2}{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$p = \frac{2}{3} \pm \frac{\sqrt{6}}{3}$$

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

$$p = \frac{2 \pm \sqrt{6}}{3}$$

$$p = \frac{2}{3} \pm \frac{\sqrt{6}}{3} =$$

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