

Equations in Quadratic form. 12/3/12

Steps for Equ. In Quadratic form:

- ① • Let "t" equal the middle term
- ② • Square both sides to get
- ③ • Substitute and solve by any method (factor, complete square, quadratic Equ.)
- ☆☆☆ ④ • Substitute t values to find values for original variables! ☆☆☆

Solve

**Example**

①  $(3x-2)^2 - 5(3x-2) - 6 = 0$   
 $t = 3x-2, t^2 = (3x-2)^2$

$t^2 - 5t - 6 = 0$

~~$\frac{-6}{t} \times \frac{1}{t}$~~

$(t-6)(t+1) = 0$

$t = 6, t = -1$

$6 = 3x-2 \quad -1 = 3x-2$   
 $+2 \quad +2 \quad +2 \quad +2$

$\frac{8}{3} = \frac{3x}{3} \quad \frac{1}{3} = \frac{3x}{3}$

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

②  $3x + 5\sqrt{x} - 2 = 0$   
 $t = \sqrt{x}, t^2 = x$   
 $3t^2 + 5t - 2 = 0$

~~$\frac{3}{t} \times \frac{1}{3t}$~~

$(t+3)(3t-1) = 0$

$t+3=0 \quad 3t-1=0$   
 $-3 \quad -3 \quad +1 \quad +1$

$t = -3 \quad \frac{3t}{3} = \frac{1}{3} \quad t = \frac{1}{3}$

$(-3)^2 = (\sqrt{x})^2$   
 ~~$9 = x$~~

$(\frac{1}{3})^2 = (\sqrt{x})^2$   
 $\frac{1}{9} = x$

Check  
 $3(9) + 5(\sqrt{9}) - 2 = 0$   
 $27 + 15 - 2 = 0$   
 No

$3(\frac{1}{9}) + 5\sqrt{\frac{1}{9}} - 2 = 0$   
 $\frac{1}{3} + \frac{5}{3} - 2 = 0$   
 $2 - 2 = 0$   
 Yes

③  $x^4 + 7x^2 - 18 = 0$

$t = x^2, t^2 = x^4$

$t^2 + 7t - 18 = 0$

$(t+9)(t-2) = 0$

$t = -9, 2$

$\sqrt{-9} = \sqrt{x^2} \quad \sqrt{2} = \sqrt{x^2}$

$x = \pm 3i, \pm \sqrt{2}$

~~$\frac{9}{t} \times \frac{-2}{t}$~~

Anytime you get rid of "sqrt" you must check for extraneous solutions!