Warmup:

1) $2(x + 5) = 16$

2) $3(t + 1) = 18$

3) $2(3y - 5) = 14$

4) $4(3t - 2) = 88$

(1) $\frac{2(x+5)}{2} = \frac{16}{2}$

$x + 5 = 8$

$-5 \quad -5$

$x = 3$

(2) $\frac{3(t+1)}{3} = \frac{18}{3}$

$t + 1 = 6$

$-1 \quad -1$

$t = 5$

(3) $\frac{2(3y-5)}{2} = \frac{14}{2}$

$3y - 5 = 7$

$+5 \quad +5$

$\frac{3y}{3} = \frac{12}{3}$ $y = 4$

(4) $\frac{4(3t-2)}{4} = \frac{88}{4}$

$3t - 2 = 22$

$+2 \quad +2$

$\frac{3t}{3} = \frac{24}{3}$ $t = 8$

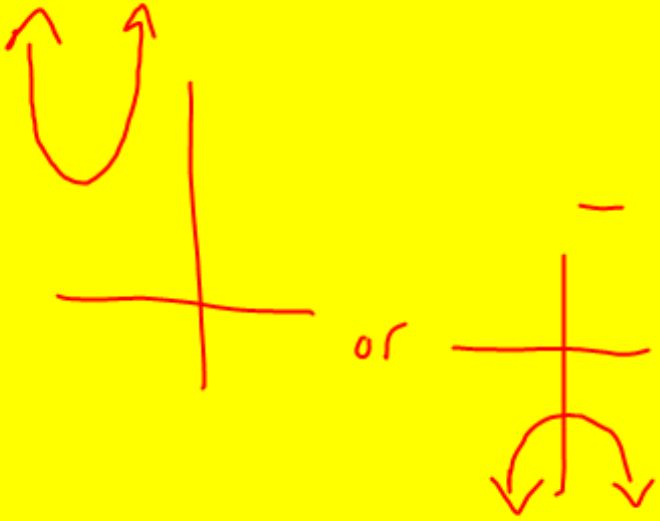
What does it mean to solve a quadratic equation?

- Looking for x-intercepts

  - 2 real solutions

  - 1 real solution (double root)

  - 0 real solutions but 2 imaginary solutions



E.Q.: How do we solve quadratic equations using the square root method?

$y = ax^2 + bx + c$

$y = (x + r_1)(x + r_2)$

$y = a(x + r)^2 + c$

$y = ax^2 + c$

Sq. root method

Solving Using Square Roots

-Another method of solving quadratic equations is by using square roots to get rid of the exponent.

-The square root method works when there is no bx term.

-The equations should look like $ax^2 + c$ after you set them equal to zero

-In order to solve using square roots:

1) Isolate the variable on one side of the equation.

2) Take the square root of both sides.

* When taking the square root you have positive and negative square root*

3) Simplify the radical expressions.

Examples:

1) $n^2 - 6 = 30$

$-30 \quad -30$

$n^2 - 36 = 0$

$+36 \quad +36$

$\sqrt{n^2} = \sqrt{36}$

$n = \pm 6$

$n = 6$ or -6

2) $\frac{-8a^2}{-8} = \frac{-216}{-8}$

$-8a^2 + 216 = 0$

$\sqrt{a^2} = \sqrt{27}$

$a = \pm 3\sqrt{3}$

3) $\frac{-3b^2}{-3} = \frac{-180}{-3}$

$\sqrt{b^2} = \sqrt{60}$

$b = \pm 2\sqrt{15}$

4) $4r^2 + 10 = 46$

$-10 \quad -10$

$4r^2 - 36 = 0$

$\frac{4r^2}{4} = \frac{36}{4}$

$\sqrt{r^2} = \sqrt{9}$

$r = \pm 3$

5) $5v^2 + 8 = 243$

$-8 \quad -8$

$\frac{5v^2}{5} = \frac{235}{5}$

$\sqrt{v^2} = \sqrt{47}$

$v = \pm\sqrt{47}$

6) $-8n^2 + 8 = -120$

$-8 \quad -8$

$\frac{-8n^2}{-8} = \frac{-128}{-8}$

$\sqrt{n^2} = \sqrt{16}$

$n = \pm 4$

7) $3x^2 + 1 = 52$

$-1 \quad -1$

$\frac{3x^2}{3} = \frac{51}{3}$

$\sqrt{x^2} = \sqrt{17}$

$x = \pm\sqrt{17}$

8) $\frac{2x^2}{2} = \frac{156}{2}$

$\sqrt{x^2} = \sqrt{78}$

$x = \pm\sqrt{78}$

- You can also use the square root method when you have a square binomial in the problem.

-The steps are the same, except now we isolate the binomial first and then take the square root.

Examples:

9) $(x-4)^2 - 3 = 13$

$+3 \quad +3$

$\sqrt{(x-4)^2} = \sqrt{16}$

$x - 4 = \pm 4$

$+4 \quad +4$

$x = 4 \pm 4$

$x = 8$

$x = 0$

or

$x - 4 = 4$

$+4 \quad +4$

$x = 8$

or

$x - 4 = -4$

$+4 \quad +4$

$x = 0$

10) $-2(x+3)^2 = -40$

$-2 \quad -2$

$\sqrt{(x+3)^2} = \sqrt{20}$

$x + 3 = \pm 2\sqrt{5}$

$-3 \quad -3$

$x = -3 \pm 2\sqrt{5}$

$-3+2\sqrt{5}$

&

$-3-2\sqrt{5}$

11) $\frac{1}{2}(x-6)^2+2=10$

$-2 \quad -2$

$\frac{\frac{1}{2}(x-6)^2}{\frac{1}{2}} = \frac{8}{\frac{1}{2}}$

$\sqrt{(x-6)^2} = \sqrt{16}$

$x-6 = \pm 4$

$+6 \quad +6$

$x = 6 \pm 4$

$x=10$

$x=2$

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

$-12 \quad -12$

$\frac{-(x-4)^2}{-1} = \frac{-12}{-1}$

$\sqrt{(x-4)^2} = \sqrt{12}$

$x-4 = \pm 2\sqrt{3}$

$+4 \quad +4$

$x = 4 \pm 2\sqrt{3}$

13) $5(x+7)^2+6=31$

$-6 \quad -6$

$\frac{5(x+7)^2}{5} = \frac{25}{5}$

$\sqrt{(x+7)^2} = \sqrt{5}$

$x+7 = \pm\sqrt{5}$

$x = -7 \pm \sqrt{5}$

14) $-\frac{1}{3}(x+2)^2+4=-22$

$-4 \quad -4$

$\frac{-\frac{1}{3}(x+2)^2}{-\frac{1}{3}} = \frac{-26}{-\frac{1}{3}}$

$\sqrt{(x+2)^2} = \sqrt{78}$

$x+2 = \pm\sqrt{78}$

$x = -2 \pm \sqrt{78}$

15) $(x-11)^2+9=90$

16) $3(x+5)^2-2=22$

Solving Using Square Roots Together

- Look at what you are given. Do you have just a letter squared? Or do you have a set of parentheses squared?

  - if you have just a letter squared, isolate that letter, take the square root, and solve

  - if you have a set of parentheses squared, isolate the parentheses, take the square root, and solve.

Examples:

1) $2(a + 3)^2 - 10 = 122$

2) $8x^2 - 9 = 583$

3) $4n^2 + 10 = 14$

4) $3(n - 10)^2 + 4 = 247$

Homework #7

Solving Quadratics by Square Roots