· Don't forget ± signs!

· Isolate x

Solve Quadratics By Square Root

Use when quadratic is in the form $x^2 = c$

1) $\sqrt{x^2} = \sqrt{36}$

$x = \pm 6$

2) $2x^2 + 7 = 207$

$-7 \quad -7$

$\frac{2x^2}{2} = \frac{200}{2}$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

3) $x^2 + 32 = -64$

$-32 \quad -32$

$\sqrt{x^2} = \sqrt{-96}$

$x = \sqrt{-96}$

$\sqrt{-1}\ \sqrt{96}$

$x = \pm 4i\sqrt{6}$

4) $64x^2 + 5 = -20$

$-5 \quad -5$

$\frac{64x^2}{64} = \frac{-25}{64}$

$\sqrt{x^2} = \sqrt{\frac{-25}{64}}$

$x = \pm \frac{5i}{8}$

5) $\sqrt{(x+7)^2} = \sqrt{-9}$

$x + 7 = \pm 3i$

$x = -7 \pm 3i$

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

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

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

SOLVING USING THE QUADRATIC FORMULA AND THE DISCRIMINANT

Recall that you can solve quadratic equations by:

1) Factoring
2) Square Root
3) Completing the Square

and now... Quadratic Formula

You can use the Quadratic Formula to solve ANY quadratic Equation that is written in standard form $ax^2 + bx + c = 0$, including equations with real or complex solution.

Quadratic Equation must be in standard form + EQUAL TO 0

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

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

$a = 1 \quad b = 2 \quad c = -3$

$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-3)}}{2(1)}$

$x = \frac{-2 \pm \sqrt{16}}{2}$

$x = 1, -3$

2) $x^2 - 4 = 0$

$a = 1 \quad b = 0 \quad c = -4$

$x = \frac{0 \pm \sqrt{(0)^2 - 4(1)(-4)}}{2(1)}$

$x = \frac{\pm\sqrt{16}}{2}$

$x = 2, -2$

3) $6x^2 - 3x - 1 = 0$

$a = 6 \quad b = -3 \quad c = -1$

$x = \frac{3 \pm \sqrt{(-3)^2 - 4(6)(-1)}}{2(6)}$

$x = \frac{3 \pm \sqrt{33}}{12}$

$x = .73, -.23$

4) $4x^2 = 12x - 9$

$4x^2 - 12x + 9 = 0$

$a = 4 \quad b = -12 \quad c = 9$

$x = \frac{12 \pm \sqrt{(-12)^2 - 4(4)(9)}}{2(4)}$

$x = \frac{12 \pm \sqrt{0}}{8}$

$x = 3/2$

5) $x^2 - 6x - 1 = 0$

$a = 1 \quad b = -6 \quad c = -1$

$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(-1)}}{2(1)}$

$x = \frac{6 \pm \sqrt{40}}{2}$

$x = 3 \pm \sqrt{10}$

$6.16, -.16$

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

$a = 4 \quad b = -4 \quad c = 3$

$x = \frac{4 \pm \sqrt{(-4)^2 - 4(4)(3)}}{2(4)}$

$x = \frac{4 \pm \sqrt{-32}}{8}$

$= \frac{4 \pm 4i\sqrt{2}}{8}$

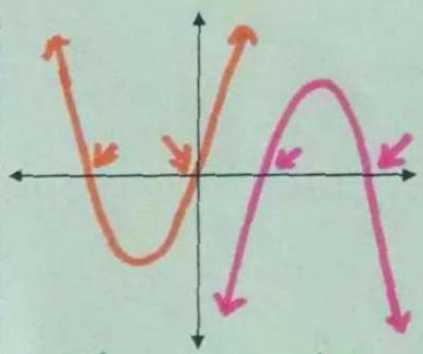
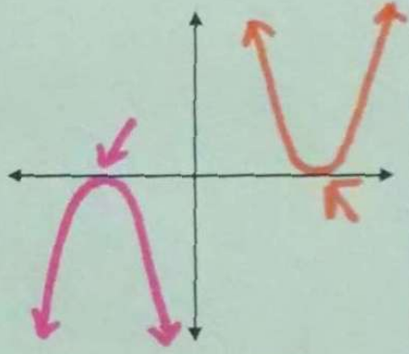
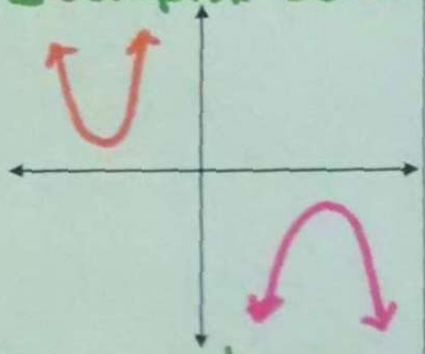
$x = \frac{1 \pm i\sqrt{2}}{2}$

STANDARD FORM $ax^2+bx+c=0$

How many solutions does a Quadratic Equation have??

→ Use the Discriminant

$$b^2-4ac$$

(+)	0	(−)
If the discriminant is > 0 → 2 real solutions	If the discriminant is = 0 → 1 real solution	If the discriminant is < 0 → no real solutions
		2 complex solutions 
Hits x-axis TWICE	Hits x-axis ONCE	Does not intersect x-axis

Determine the number of solutions for each quadratic function.

1) $2x^2-5x+8=0$

a= 2 b= -5 c= 8

$(-5)^2-4(2)(8)$

Disc: -39

→ 2 complex Solutions

2) $4x^2-25=0$

a=4 b=0 c=-25

$(0)^2-4(4)(-25)$

Disc: 400

→ 2 real Solutions

3) $x^2-6x=-9$

$x^2-6x+9=0$

a=1 b=-6 c=9

$(-6)^2-4(1)(9)$

Disc: 0

→ 1 real Solution

Must be in standard Form AND EQUAL TO ZERO

GLUE HERE