

Solving Quadratics with Complex Roots

The Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	1	Write the equation in standard form, $ax^2 + bx + c$
	2	Identify a, b, and c; Substitute them into the formula.
	3	Simplify!

Directions: Solve each equation using the Quadratic Formula.

1.) $x^2 + 2x + 5 = 0$ $a=1$ $b=2$ $c=5$

$$\frac{-2 \pm \sqrt{(2)^2 - 4(1)(5)}}{2(1)} \Rightarrow \frac{-2 \pm \sqrt{-16}}{2}$$

$$\Rightarrow \frac{-2 \pm 4i}{2} \Rightarrow \boxed{-1 \pm 2i}$$

2.) $5x^2 + 8x + 5 = 0$ $a=5$ $b=8$ $c=5$

$$\frac{-8 \pm \sqrt{(8)^2 - 4(5)(5)}}{2(5)} \Rightarrow \frac{-8 \pm \sqrt{-36}}{10}$$

$$\Rightarrow \frac{-8 \pm 6i}{10} \Rightarrow \boxed{\frac{-4 \pm 3i}{5}}$$

3.) $x^2 + 3x + 9 = 0$ $a=1$ $b=3$ $c=9$

$$\frac{-3 \pm \sqrt{(3)^2 - 4(1)(9)}}{2(1)} \Rightarrow \frac{-3 \pm \sqrt{-27}}{2}$$

$$\Rightarrow \boxed{\frac{-3 \pm 3i\sqrt{3}}{2}}$$

$27 = 9^3$

4.) $2x^2 + 7x + 8 = 0$ $a=2$ $b=7$ $c=8$

$$\frac{-7 \pm \sqrt{(7)^2 - 4(2)(8)}}{2(2)} \Rightarrow \frac{-7 \pm \sqrt{-15}}{4}$$

$$\Rightarrow \boxed{\frac{-7 \pm i\sqrt{15}}{4}}$$

5.) $3x^2 + x = -2$ $3x^2 + x + 2 = 0$
 $+2$ $+2$ $a=3$ $b=1$ $c=2$

$$\frac{-1 \pm \sqrt{(1)^2 - 4(3)(2)}}{2(3)} \Rightarrow \frac{-1 \pm \sqrt{-23}}{6}$$

$$\Rightarrow \boxed{\frac{-1 \pm i\sqrt{23}}{6}}$$

11.) $2x^2 + 8 = 5x + x^2$
 $-x^2 - 5x - 5x - x^2$ $a=1$ $b=-5$ $c=8$
 $x^2 - 5x + 8 = 0$

$$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(8)}}{2(1)} \Rightarrow \frac{5 \pm \sqrt{-7}}{2}$$

$$\Rightarrow \boxed{\frac{5 \pm i\sqrt{7}}{2}}$$