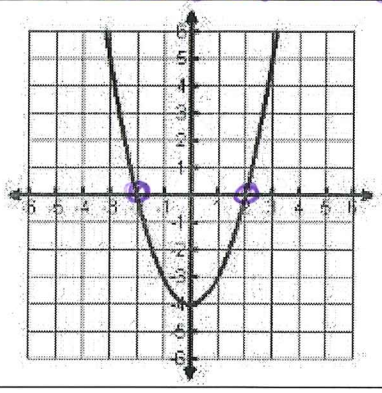
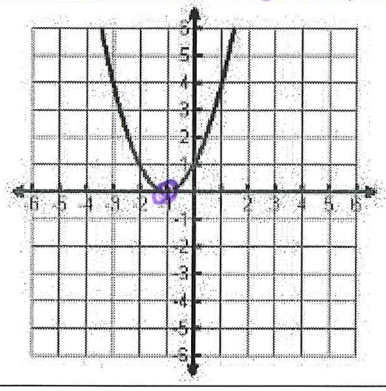
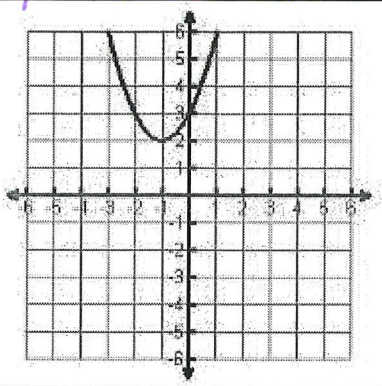
Solving Quadratic Equations with Complex Roots

I Can Solve quadratic equations w/ Complex Roots

# of Solutions	2 Solutions	1 Solution	∅ Real Sol.
Graphically			
Descriminant b^2-4ac	>0 (positive)	$=0$	<0 (negative)

~ Quadratic Formula ~

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

Solve: $-4x^2 = 7x - 2$

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

$a = 4$
$b = 7$
$c = -2$

$$x = \frac{-7 \pm \sqrt{(7)^2 - 4(4)(-2)}}{2(4)}$$

$$= \frac{-7 \pm \sqrt{49 + 32}}{8} = \frac{-7 \pm \sqrt{81}}{8}$$

$$= \frac{-7 \pm 9}{8}$$

$+ \rightarrow \frac{-7+9}{8} = \frac{2}{8} = \boxed{\frac{1}{4}}$

$- \rightarrow \frac{-7-9}{8} = \frac{-16}{8} = \boxed{-2}$

① Standard form $0 = ax^2 + bx + c$
② abc's
③ Substitute
④ Simplify

Solve: $x^2+x+10=0$

$a=1 \quad b=1 \quad c=10$

$$\frac{-1\pm\sqrt{(1)^2-4(1)(10)}}{2(1)} = \frac{-1\pm\sqrt{1-40}}{2} = \frac{-1\pm\sqrt{-39}}{2}$$

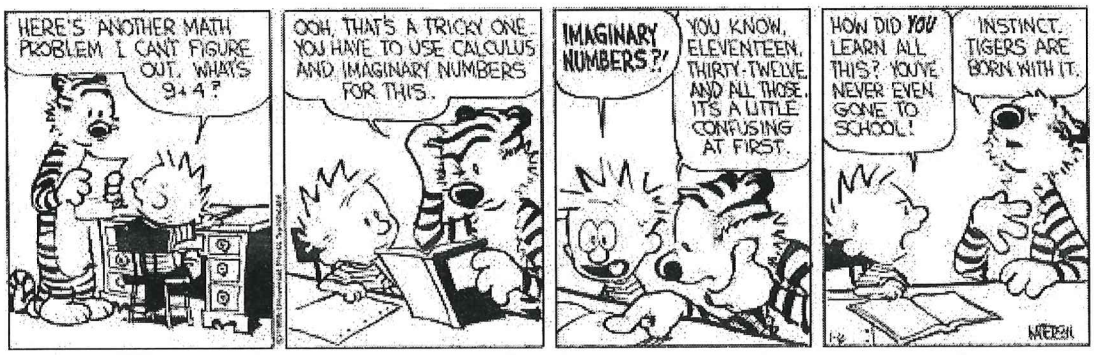
$$= \frac{-1\pm i\sqrt{39}}{2} = \frac{-1+i\sqrt{39}}{2} \text{ and } \frac{-1-i\sqrt{39}}{2}$$

Solve: $7x^2+12=4$

$$7x^2+12=4$$
$$-4 \quad -4$$
$$7x^2+8=0$$

$a=7 \quad b=0 \quad c=8$

$$\frac{0\pm\sqrt{0-4(7)(8)}}{2(7)} = \frac{0\pm\sqrt{-224}}{14} = \frac{\pm 4i\sqrt{14}}{14} = \frac{\pm 2i\sqrt{14}}{7}$$

224 = 2 · 112 = 2 · 2 · 56 = 2 · 2 · 2 · 28 = 2 · 2 · 2 · 2 · 14 = 2 · 2 · 2 · 2 · 2 · 7

$$\frac{2i\sqrt{14}}{7} \quad \frac{-2i\sqrt{14}}{7}$$