

discriminant

How many real solutions?

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

1.) $x^2 + 7x - 10 = -3$
 $\quad\quad\quad +3 \quad +3$

$x^2 + 7x - 7 = 0$

$a = 1 \quad b = 7 \quad c = -7$

$b^2 - 4ac$

$(7)^2 - 4(1)(-7)$

$49 + 28 = +77$

2 real solutions

h of vertex	# of Reals
$\oplus \quad b^2 - 4ac > 0$	2
$\quad \quad \quad b^2 - 4ac = 0$	1
$\ominus \quad b^2 - 4ac < 0$	0

2.) $-4x^2 - 8x - 14 = -10$
 $\quad\quad\quad +10 \quad +10$

$-4x^2 - 8x - 4 = 0$

How many real solutions?

$a = -4 \quad b = -8 \quad c = -4$

$b^2 - 4ac$

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

$64 - 64 = 0$

1 real solution

$$\frac{-8 \pm \sqrt{-176}}{12}$$

$$\frac{-8 \pm 4i\sqrt{11}}{12 \div 4}$$

$$\boxed{\frac{-2 \pm i\sqrt{11}}{3}}$$

$$\sqrt{-176} = \sqrt{176} * \sqrt{-1} \rightarrow i$$

$$\begin{array}{l} \sqrt{176} \\ \swarrow \quad \searrow \\ \sqrt{4} \quad \sqrt{44} \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 2 \quad \sqrt{4} \quad \sqrt{11} \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 2 \quad 2 \cdot 2 \cdot \sqrt{11} \cdot i \\ 4i\sqrt{11} \end{array}$$

$$\begin{array}{r} 44 \\ 4 \overline{)176} \\ \underline{-16} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

1.) $2x^2 = 8x - 12$
 $-8x + 12 \quad -8x + 12$

$$2x^2 - 8x + 12 = 0$$

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

$$a=2 \quad b=-8 \quad c=12$$

$$\frac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(12)}}{2(2)}$$

$$\frac{8 \pm \sqrt{64 - 96}}{4}$$

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

$$\begin{array}{l} \sqrt{-32} \\ \wedge \\ \sqrt{16} \cdot \sqrt{2} \cdot i \\ 4i\sqrt{2} \end{array}$$

$$\frac{8 \pm 4i\sqrt{2}}{4 \div 4} \quad \boxed{2 \pm i\sqrt{2}}$$

$$2.) \quad 11x^2 - 6x = 6$$

$$a=11 \quad b=-6 \quad c=-6$$

$$\begin{aligned} & \sqrt{300} \\ & \quad \wedge \\ & \sqrt{100} \cdot \sqrt{3} \\ & 10\sqrt{3} \\ & \begin{array}{c} \div 2 \quad \div 2 \\ 6 \pm 10\sqrt{3} \\ \hline 22 \div 2 \end{array} \end{aligned}$$

$$\boxed{\frac{3 \pm 5\sqrt{3}}{11}}$$

$$11x^2 - 6x - 6 = 0$$

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

$$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(11)(-6)}}{2(11)}$$

$$\frac{6 \pm \sqrt{36 + 264}}{22}$$

$$\frac{6 \pm \sqrt{300}}{22}$$

$$i = \sqrt{-1}$$

$$i^2 = i \cdot i = \sqrt{-1} \cdot \sqrt{-1} = \textcircled{-1}$$

$$i^3 = i^2 \cdot i = -1 \cdot i = -1 \cdot \sqrt{-1} = -\sqrt{-1} \text{ or } -i$$

$$i^4 = i^2 \cdot i^2 = -1 \cdot -1 = 1$$

$$i^9 = i \quad i^{11} = -i$$

$$i^{10} = -1 \quad i^{12} = 1$$

$$i = i \quad i^5 = i$$

$$i^2 = -1 \quad i^6 = -1$$

$$i^3 = -i \quad i^7 = -i$$

$$i^4 = 1 \quad i^8 = 1$$

$$(-5 + 4i)^2 = (-5 + 4i)(-5 + 4i) \quad \text{FOIL}$$

$$25 - 20i - 20i + 16i^2$$

$$16(-1) = -16$$

$$25 - 20i - 20i - 16$$

$$\boxed{9 - 40i}$$

$$(3 - 4i)(-3 - 5i)$$

FOIL

$$-9 - 15i + 12i + 20i^2$$

$$20(-1)$$

$$-9 - 15i + 12i - 20 = \boxed{-29 - 3i}$$