W-A2 Algebra 2 Week 27 4/10

How many real solutions?

Quadratic Formula

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

h

$h = \frac{-b}{2a} \rightarrow$ vertex

discriminant

↓

How many real solutions

1.) $x^2 + 7x - 10 = -3$ ← 0

$\quad\quad\quad +3 \quad +3$

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

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

$\underbrace{b^2 - 4ac}$

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

$49 + 28 = 77$

$\boxed{2 \text{ real solutions}}$

	Real Zeros
$b^2 - 4ac > 0 \rightarrow$	2
$\boxed{b^2 - 4ac = 0 \rightarrow 1}$	
$b^2 - 4ac < 0 \rightarrow$	0

2.) How many reals?

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

$\quad\quad\quad +10 \quad +10$

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

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

$b^2 - 4ac$

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

$64 - 64 = 0$

$\boxed{1 \text{ real solution}}$

$$X^2 = -10x - 12$$

$+10x \quad +12 \qquad +10x \quad +12$

$$x^2 + 10x + 12 = 0$$

$a = 1 \qquad b = 10 \qquad c = 12$

$\sqrt{52}$

$\sqrt{4} \qquad \sqrt{13}$

$2\sqrt{13}$

H → average of zeros

$$\frac{-5 + \cancel{\sqrt{13}} + (-5) - \cancel{\sqrt{13}}}{2} = \frac{-10}{2}$$

$= -5$

Find the zeros

$\_\_ * \_\_ = 12$

$\_\_ + \_\_ = 10$

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

$$\frac{-10 \pm \sqrt{(10)^2 - 4(1)(12)}}{2(1)}$$

$$\frac{-10 \pm \sqrt{100 - 48}}{2}$$

$$\frac{-10 \pm \sqrt{\boxed{52}}}{2}$$

2 real solutions

$$\frac{-10^{\div 2} \pm 2^{\div 2}\sqrt{13}}{2^{\div 2}}$$

$$\boxed{-5 \pm \sqrt{13}}$$

Find the zeros.

$$6x^2 + 8x = -10$$
$$+10 \quad +10$$

$$6x^2 + 8x + 10 = 0$$

$a = 6 \quad b = 8 \quad c = 10$

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

$$\frac{-8 \pm \sqrt{(8)^2 - 4(6)(10)}}{2(6)}$$

$$\frac{-8 \pm \sqrt{64 - 240}}{12}$$

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

0 real solutions

$$\sqrt{-176}$$

$$\sqrt{-1} \cdot \sqrt{176}$$

$$\sqrt{4} \cdot \sqrt{44}$$

$$\sqrt{4} \quad \sqrt{11}$$

$$\sqrt{-1} \cdot \sqrt{4} \cdot \sqrt{4} \cdot \sqrt{11}$$

$$i \cdot 2 \cdot 2 \cdot \sqrt{11} = 4i\sqrt{11}$$

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

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

$$2x^2 = 8x - 12$$
$$-8x + 12 \quad -8x \quad +12$$

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

Find the zeros

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

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

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

$$\frac{8 \pm \sqrt{64 - 96}}{4} = \frac{8 \pm \sqrt{-32}}{4}$$

$$\sqrt{-32}$$
$$\sqrt{-1} \quad \sqrt{4} \cdot \sqrt{8}$$
$$\sqrt{4} \quad \sqrt{2}$$
$$i \cdot 2 \cdot 2\sqrt{2} = 4i\sqrt{2}$$

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

$$\boxed{2 \pm i\sqrt{2}}$$

$i = \sqrt{-1}$

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

$i^3 = i^2 \cdot i = -1 \cdot i = -i$

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

$2^2 = 2 \cdot 2$

$\sqrt{4} \cdot \sqrt{4} = 4$

$\sqrt{16} = 4$

$(4)^{\frac{1}{2}}(4^{\frac{1}{2}}) = 4^{\frac{1}{2}+\frac{1}{2}} = 4^1$

$\cancel{\sqrt{3}} \cdot \cancel{\sqrt{3}} = 3$

$\sqrt{19} \cdot \sqrt{19} = 19$

$\sqrt{x} \cdot \sqrt{x} = x$

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

$i = i$	$i^5 = i$	$i^9 = i$
$i^2 = -1$	$i^6 = -1$	$i^{10} = -1$
$i^3 = -i$	$i^7 = -i$	$i^{11} = -i$
$i^4 = 1$	$i^8 = 1$	$i^{12} = 1$

Complex Numbers

$3^2 = 3 \cdot 3$

FOIL!

$(-5+4i)^2 = (-5+4i)(-5+4i)$

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

$i^2 = -1$

$16(-1) = -16$

$25 - \underbrace{20i - 20i}_{} - 16$

$25 - 16 = 9$

$-20i - 20i = -40i$

$\boxed{9 - 40i}$

FOIL

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

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

$20i^2 = 20(-1) = -20$

$-9 \quad -15i + 12i \quad -20$

$\boxed{-29 - 3i}$