T-A2 Algebra 2 Week 27 4/2

How many real solutions?

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

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

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

$b^2 - 4ac$

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

$49 + 28 = 77$

Quadratic formula

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

discriminant

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

# of Real

$b^2 - 4ac > 0 \rightarrow 2$

$b^2 - 4ac = 0 \rightarrow 1$

$b^2 - 4ac < 0 \rightarrow 0$

2 real solutions

How many reals?

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

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

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

$b^2 - 4ac$

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

$64 - 64 = 0$

1 real solution

$x^2 = -10x - 12$

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

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

Find the zeros

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

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

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

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

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

$$\frac{-10 \pm \sqrt{100 - 48}}{2} = \frac{-10 \pm \sqrt{52}}{2}$$

$\sqrt{52}$

$\sqrt{4} \quad \sqrt{13}$

$2\sqrt{13}$

$$\frac{-10 \pm 2\sqrt{13}}{2} \quad (\div 2, \div 2)$$

$$\frac{-10}{2} = -5$$

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

H → Average of zeros

$-5 + \sqrt{13}, \quad -5 - \sqrt{13}$

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

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

$6x^2 + 8x = -10$ (0)

$+10 \quad +10$

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

Find the zeros.

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

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

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

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

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

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

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

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

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

$4i\sqrt{11}$

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

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

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

$2x^2 = 8x - 12$

$-8x + 12 \quad -8x \quad +12$

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

$\sqrt{-32}$

$\sqrt{-1} \cdot \sqrt{16} \cdot \sqrt{2}$

$4i\sqrt{2}$

Find the zeros

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

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

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

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

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

$\div 4 \quad \div 4$

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

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

$i = \sqrt{-1}$

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

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

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

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

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

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

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

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

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

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

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

$25 - 20i - 20i + 16i^2$ $\quad i^2 = -1$

$16(-1) = -16$

$25 - 20i - 20i - 16$

$25 - 40i - 16$

$\boxed{9 - 40i}$

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

$-9 - 15i + 12i + 20i^2$ $\quad 20(-1) = -20$

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

$\boxed{-29 - 3i}$