M-A2 Algebra 2 Week 28 4/29

$(2i+3)(4i-5)$ FOIL

$i^2 = -1$

$8i^2 - 10i + 12i - 15$

$8i^2 + 2i - 15$

$8(-1)$

$-8 + 2i - 15 = \boxed{-23 + 2i}$

$(8-3i)(4+2i)$

$32 + 16i - 12i - 6i^2$

$-6(-1)$

$32 + 16i - 12i + 6 = \boxed{38 + 4i}$

$ax^2 + bx + c$

$x^2 + 20x + 75 = 0$

Find the vertex (h,k)

1.) $h = \frac{-b}{2a}$

Quadratic formula

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

h

Discriminant

$a = 1 \quad b = 20 \quad c = 75$

$\frac{-20}{2(1)} = \frac{-20}{2} = -10 = h$

to find k value

Vertex: (h,k)

$(-10, -25)$

$x^2 + 20x + 75$

$(-10)^2 + 20(-10) + 75$

$100 + (-200) + 75 = -25 = k$

2.) Find the zeros $\longrightarrow$ take the average.

$x^2 + 20x + 75 = 0$

$\underline{5} * \underline{15} = 75$

$\underline{5} + \underline{15} = 20$

$(x+5)(x+15) = 0$

$-5 \quad -15$

$h = \frac{-5 + (-15)}{2} = \frac{-20}{2} = -10$

$k = (x+5)(x+15)$

$(-10+5)(-10+15)$

$(-5)(5) = -25$

vertex $(-10, -25)$

Completing the Square!

$x^2 + 20x + 75 = 0$

$(x^2 + 20x) + 75 = 0$

$b = 20$ $\quad +100 \quad -100$

$\left(\frac{20}{2}\right)^2 = 10^2 = 100$

$(x^2 + 20x + 100) + 75 - 100 = 0$

$(x^2 + 20x + 100) - 25 = 0$

$\sqrt{x^2}$ $\quad \sqrt{100}$

$(x + 10)^2 - 25 = 0$

vertex form

$a(x - h)^2 + k = y$

opposite

$(-10, -25)$

1.) 2020 it.

* 2.) Factor out "a" term

3.) $\left(\frac{b}{2}\right)^2$ add inside sub outside

4.) Square root of 1st and last terms

$\boxed{x^2 + 20x + 100 = (x+10)^2}$

$(x+10)(x+10)$

$x^2 + 10x + 10x + 100$

$x^2 + 20x + 100$

$(x+10)^2 - 25 = 0$

$+25 \quad +25$

$\sqrt{(x+10)^2} = \sqrt{25}$

$x + 10 = \pm 5$

$-10 \quad -10$

$x = -10 \pm 5$

$-10 + 5 = -5$

$-10 - 5 = -15$

$x^2 + 16x + 48 = 0$

Convert to vertex form

1.) ✓ 2020 it

2.) ✓ Factor out "a"

3.) ✓ $\left(\frac{b}{2}\right)^2$ → add inside sub outside

4.) Square root 1st and last

$(x^2 + 16x) + 48 = 0$

$\left(\frac{16}{2}\right)^2 \quad +64 \quad -64$

$8^2 = 64$

$(x^2 + 16x + 64) + 48 - 64 = 0$

$(x^2 + 16x + 64) - 16$

$\sqrt{x^2}$ $\qquad$ $\sqrt{64}$

$(x + 8)^2 - 16$

$a(x-h)^2 + k$

vertex: (h, k)

$(-8, -16)$

Find zeros

$(x+8)^2 - 16 = 0$

$+16 \quad +16$

$\sqrt{(x+8)^2} = \sqrt{16}$

$x + 8 = \pm 4$

$-8 \quad -8$

$x = -8 \pm 4$

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

1.) 2020 it

2.) Factor out "a"

3.) $\left(\frac{b}{2}\right)^2$ add in sub out

$$\frac{(2x^2 + 8x)}{2} + 6 = 0$$

$$2(x^2 + 4x) + 6 = 0$$

$+4$ $\quad -4(2)$

$\left(\frac{4}{2}\right)^2 = 2^2 = 4$

$$2(x^2 + 4x + 4) + 6 - 8 = 0$$

$$2(x^2 + 4x + 4) - 2 = 0$$

$\sqrt{x^2}$ $\quad \sqrt{4}$

$$2(x + 2)^2 - 2 = 0$$

vertex: $(-2, -2)$

vertex form

$$2(x+2)^2 - 2$$