W-A2 Algebra 2 Week 27

Quadratic Formula

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

$y = 2x^2 - 4x - 16$

$a = 2$

$b = -4$

$c = -16$

$$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-16)}}{2(2)}$$

$$\frac{4 \pm \sqrt{16 + 128}}{4}$$

$$\frac{4 \pm \sqrt{144}}{4} = \frac{4 \pm 12}{4}$$

$\frac{4+12}{4}$ $\frac{4-12}{4}$

$\frac{16}{4} = 4$ $\frac{-8}{4} = -2$

$y = x^2 + 4x + 12$

$a = 1 \quad b = 4 \quad c = 12$

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

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

$$\frac{-4 \pm \sqrt{16 - 48}}{2} = \frac{-4 \pm \sqrt{-32}}{2}$$

$\sqrt{-32} = \sqrt{32}\sqrt{-1} \rightarrow i$

$\sqrt{16} \cdot \sqrt{2} \cdot i$

$4\sqrt{2} \cdot i$

$4i\sqrt{2}$

$$\frac{-4 \pm 4i\sqrt{2}}{2} \quad \begin{matrix} \div 2 \\ \div 2 \end{matrix}$$

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

Quadratic Formula

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

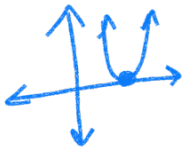
Discriminant: b^2-4ac

$\frac{-b}{2a}$ → x coordinate for the vertex

Vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

$b^2-4ac > 0$ positive
2 real solutions

$b^2-4ac = 0$
1 real solution



$b^2-4ac < 0$ negative → imaginary
0 real solutions

up to 2 possible solutions

$x^2 - 2x - 16$

$a = 1$
$b = -2$
$c = -16$

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

$$\frac{-(-2) \pm \sqrt{(-2)^2-4(1)(-16)}}{2(1)}$$

$$\frac{2 \pm \sqrt{4+64}}{2}$$

$$\frac{2 \pm \sqrt{68}}{2}$$

simplifying radicals

$$\frac{2 \pm \sqrt{4}\sqrt{17}}{2} = \frac{\overset{\div 2}{2} \pm \overset{\div 2}{2}\sqrt{17}}{\underset{\div 2}{2}}$$

$$\boxed{1 \pm \sqrt{17}}$$

$1+\sqrt{17}$ $1-\sqrt{17}$

b^2-4ac
$68 > 0$
2 real solutions

$y = 3x^2 + 2x + 8$

$a = 3$
$b = 2$
$c = 8$

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

$$\frac{-2 \pm \sqrt{(2)^2 - 4(3)(8)}}{2(3)}$$

$$\frac{-2 \pm \sqrt{4 - 96}}{6}$$

$$\frac{-2 \pm \sqrt{-92}}{6}$$

-92 discriminant

(+) > 0 (2)

$0 = 0$ (1)

(−) < 0 (0)

$\sqrt{-92} = \sqrt{92}\,\sqrt{-1}$ → i

$\sqrt{92}$

$\sqrt{2}$ $\sqrt{46}$

$\sqrt{2}$ $\sqrt{23}$

$\sqrt{92} = \sqrt{23} \cdot \sqrt{2} \cdot \sqrt{2}$

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

$\sqrt{92} = 2\sqrt{23}$

$$\frac{-2 \pm 2i\sqrt{23}}{6}$$

$$\frac{-1 \pm i\sqrt{23}}{3}$$

$$\frac{-1 + i\sqrt{23}}{3}, \quad \frac{-1 - i\sqrt{23}}{3}$$

$i = \sqrt{-1}$

$i^2 = i \cdot i$

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

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

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

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

$-1 \cdot -1 = 1$

$i^5 = i^4 \cdot i$

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

$i^{16} = 1$

$4 \overline{)16}$ 4

-16

0

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

$i^2 = -1$

$i^3 = -\sqrt{-1} = -i$

$i^4 = 1$

$i^5 = i$

$i^6 = -1$

$i^7 = -i$

$i^8 = 1$

i^{67}

$4 \overline{)67}$ 16

$-4\downarrow$

27

-24

3

$i^{67} \rightarrow i^3$

$i^{67} \rightarrow \boxed{-i}$

$6i \cdot 4i = \boxed{-24}$

$24 \cdot i^2$

$24 \cdot -1 = \boxed{-24}$

$i^2 = -1$

$(3+i)(2+i)$ FOIL

$6 + 3i + 2i + i^2$

$6 + 5i + i^2$

$6 + 5i + (-1)$

$\boxed{5 + 5i}$

real

imaginary

complex number

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

$3+2 - 3i - 5 + i$

$5 - 3i - 5 + i$

$-3i + i = -2i$

$4i(5-3i)$

$20i - 12i^2$

$20i - 12(-1)$

$20i + 12$

$12 + 20i$

HW

Ch 5.6 (evens)
Ch 5.8 (evens)
* Supplemented WS
Online HW 27 } April 27th
Quiz 27

HW/Q25 due tonight
HW/Q26 April 23rd