

Lesson Vocabulary

Simplify Radicals - Look for the largest Perfect Square Factor.

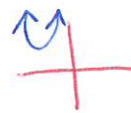
Quadratic Formula : $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Discriminant : $b^2 - 4ac$

• if $b^2 - 4ac > 0$, 2 real soln

• if $b^2 - 4ac = 0$, 1 real soln

• if $b^2 - 4ac < 0$, no real soln, imaginary



Imaginary Number - A non-real number

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

Complex Number - A combination of a real # and an imaginary #.

$$a + bi \quad a - \text{real \#, } bi - \text{imaginary \#}$$

ex.) Solve using Quadratic Formula

a) $bx^2 + 2x + 5 = 0$

$$x = \frac{-2 \pm \sqrt{b^2 - 4(2)(5)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{-116}}{2}$$

$$x = \frac{-2 \pm \sqrt{-1 \cdot 4 \cdot 29}}{2}$$

$$x = \frac{-2 \pm 2i\sqrt{29}}{2}$$

$$x = -1 \pm i\sqrt{29}$$

6

b) $x^2 - 4x + 10 = 0$

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

$$x = \frac{4 \pm \sqrt{-24}}{2} = \frac{4 \pm \sqrt{-1 \cdot 4 \cdot 6}}{2}$$

$$x = \frac{4 \pm 2i\sqrt{6}}{2}$$

$$x = 2 \pm i\sqrt{6}$$

Example Problem(s)

ex.) Simplify

a) $\sqrt{121} = 11$

b) $\sqrt{20} = \sqrt{4 \cdot 5}$
 $= 2\sqrt{5}$

c) $\sqrt{243} = \sqrt{81 \cdot 3}$
 $= 9\sqrt{3}$

d) $\sqrt{80} = \sqrt{16 \cdot 5}$
 $= 4\sqrt{5}$

e) $\sqrt{26} = \sqrt{26}$

f) $\sqrt{68} = \sqrt{4 \cdot 17}$
 $= 2\sqrt{17}$

ex.) Solve using Quadratic Formula,

a) $2x^2 = -3x + 5$
 $2x^2 + 3x - 5 = 0$

$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(-5)}}{2(2)}$

$x = \frac{-3 \pm \sqrt{49}}{4}$

$x = \frac{-3 \pm 7}{4}$

$x = \frac{-3+7}{4}$ $x = \frac{-3-7}{4}$

$x = 1$ $x = -\frac{5}{2}$

b) $9n^2 + 4n - 16 = 0$

$x = \frac{-4 \pm \sqrt{4^2 - 4(9)(-16)}}{2(9)}$

$x = \frac{-4 \pm \sqrt{592}}{18} = \frac{-4 \pm \sqrt{16 \cdot 37}}{18}$

$x = \frac{-4 \pm 4\sqrt{37}}{18}$

$x = \frac{-2 \pm 2\sqrt{37}}{9}$

ex.) find the discriminant and describe the solution.

a) $4a^2 = 8a - 4$
 $4a^2 - 8a + 4 = 0$

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

1 real soln

b) $9n^2 - 3n + 2 = 0$

$(-3)^2 - 4(9)(2)$

-63

No real soln,

imaginary

ex.) Simplify,

a) $(-2-i)(4+i)$
 $-8 - 2i - 4i - i^2$
 $-8 - 6i - (-1)$

$-8 - 6i + 1$

$-7 - 6i$

b) $(7-6i)(-8+3i)$
 $-56 + 21i + 48i - 18i^2$
 $-56 + 69i - 18(-1)$
 $-56 + 69i + 18$
 $-38 + 69i$