Review Exercise Set 2

Quadratic formula is \( x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)

Discriminant = \( b^2 - 4ac \)

Exercise 1: Use the discriminant to determine whether the following equation has 2 real number solutions, 1 real number solution, or no real number solutions (both solutions are imaginary).

\[ 3x^2 + 2x + 4 = 0 \]

Exercise 2: Use the discriminant to determine whether the following equation has 2 real number solutions, 1 real number solution, or no real number solutions (both solutions are imaginary).

\[ x^2 - 11x + 30 = 0 \]

Exercise 3: Use the quadratic formula to solve the following equation.

\[ 4x^2 + 11x = 3 \]
Exercise 4: Use the quadratic formula to solve the following equation.

\[ x^2 - x + 30 = 0 \]

Exercise 5: Use the quadratic formula to solve the following equation.

\[ 2b^2 = 16 - 8b \]
Review Exercise Set 2 Answer Key

Exercise 1: Use the discriminant to determine whether the following equation has 2 real number solutions, 1 real number solution, or no real number solutions (both solutions are imaginary).

\[ 3x^2 + 2x + 4 = 0 \]

\[ a = 3, \ b = 2, \ c = 4 \]

\[ b^2 - 4ac = (2)^2 - 4(3)(4) \]
\[ b^2 - 4ac = 4 - 48 \]
\[ b^2 - 4ac = -44 \]

Since the discriminant is negative, there will be no real number solutions to this quadratic equation. Both solutions would be imaginary numbers.

Exercise 2: Use the discriminant to determine whether the following equation has 2 real number solutions, 1 real number solution, or no real number solutions (both solutions are imaginary).

\[ x^2 - 11x + 30 = 0 \]

\[ a = 1, \ b = -11, \ c = 30 \]

\[ b^2 - 4ac = (-11)^2 - 4(1)(30) \]
\[ b^2 - 4ac = 121 - 120 \]
\[ b^2 - 4ac = 1 \]

Since the discriminant is positive, there will be two real number solutions to this quadratic equation.

Exercise 3: Use the quadratic formula to solve the following equation.

\[ 4x^2 + 11x = 3 \]

First, get all of the terms on the left side

\[ 4x^2 + 11x - 3 = 0 \]
Exercise 3 (Continued):

Now, use the quadratic formula where $a = 4$, $b = 11$, $c = -3$

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-(11) \pm \sqrt{(11)^2 - 4(4)(-3)}}{2(4)} \]

\[ x = \frac{-11 \pm \sqrt{121 + 48}}{8} \]

\[ x = \frac{-11 \pm \sqrt{169}}{8} \]

\[ x = \frac{-11 \pm 13}{8} \]

\[ x = \frac{-11 + 13}{8} \quad \text{or} \quad x = \frac{-11 - 13}{8} \]

\[ x = \frac{2}{8} \quad x = \frac{-24}{8} \]

\[ x = \frac{1}{4} \quad x = -3 \]

Exercise 4: Use the quadratic formula to solve the following equation.

\[ x^2 - x + 30 = 0 \]

$a = 1$, $b = -1$, $c = 30$

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(30)}}{2(1)} \]

\[ x = \frac{1 \pm \sqrt{1 - 120}}{2} \]

\[ x = \frac{1 \pm \sqrt{-119}}{2} \]

\[ x = \frac{1 \pm i\sqrt{119}}{2} \]

\[ x = \frac{1 + i\sqrt{119}}{2} \quad \text{or} \quad x = \frac{1 - i\sqrt{119}}{2} \]
Exercise 5: Use the quadratic formula to solve the following equation.

\[ 2b^2 = 16 \cdot 8b \]
\[ 2b^2 + 8b - 16 = 0 \]

\[ a = 2, \ b = 8, \ c = -16 \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]
\[ x = \frac{-(8) \pm \sqrt{(8)^2 - 4(2)(-16)}}{2(2)} \]
\[ x = \frac{-8 \pm \sqrt{64 + 128}}{4} \]
\[ x = \frac{-8 \pm \sqrt{192}}{4} \]
\[ x = \frac{-8 \pm 8\sqrt{3}}{4} \]
\[ x = \frac{-8 + 8\sqrt{3}}{4} \quad \text{or} \quad x = \frac{-8 - 8\sqrt{3}}{4} \]
\[ x = -2 + 2\sqrt{3} \quad x = -2 - 2\sqrt{3} \]