Topic: Zero Theorem

Question: Solve the quadratic equation.

$$x^2 + 3x - 4 = 0$$

Answer choices:

A $x = -4, \ -1$

B $x = 1, \ 4$

C $x = -4, \ 1$

D $x = -1, \ 4$

Solution: C

To factor the quadratic, we're looking for factors of -4 that sum to 3.

$$x^2 + 3x - 4 = 0$$

$$(x + 4)(x - 1) = 0$$

With the equation factored, the Zero Theorem tells us that we can set each factor equal to 0 individually.

$$x + 4 = 0$$

$$x = -4$$

and

$$x - 1 = 0$$

$$x = 1$$

The solutions are $x = -4$ and $x = 1$.

Topic: Zero Theorem

Question: Solve the quadratic equation.

$$x^2 - 5x - 6 = 0$$

Answer choices:

A $x = -2, 3$

B $x = -1, 6$

C $x = -6, 1$

D $x = -3, 2$

Solution: B

To factor the quadratic, we're looking for factors of -6 that sum to -5.

$$x^2 - 5x - 6 = 0$$

$$(x - 6)(x + 1) = 0$$

With the equation factored, the Zero Theorem tells us that we can set each factor equal to 0 individually.

$$x + 1 = 0$$

$$x = -1$$

and

$$x - 6 = 0$$

$$x = 6$$

The solutions are $x = -1$ and $x = 6$.

Topic: Zero Theorem

Question: Solve the quadratic equation.

$$x^2 - 18 = 3x$$

Answer choices:

A $x = -6, 3$

B $x = -3, 6$

C $x = -8, 4$

D $x = 4, 9$

Solution: B

Before we can factor the quadratic, we need to move $3x$ to the other side of the equation by subtracting $3x$ from both sides.

$$x^2 - 18 = 3x$$

$$x^2 - 3x - 18 = 3x - 3x$$

$$x^2 - 3x - 18 = 0$$

To factor the quadratic, we're looking for factors of -18 that sum to -3.

$$(x - 6)(x + 3) = 0$$

With the equation factored, the Zero Theorem tells us that we can set each factor equal to 0 individually.

$$x + 3 = 0$$

$$x = -3$$

and

$$x - 6 = 0$$

$$x = 6$$

The solutions are $x = -3$ and $x = 6$.