A.REI.B.4: Solving Quadratics 7

1 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

2 Solve $x^2 + 8x = 33$ for x by completing the square.

3 Solve the following equation by completing the square: $x^2 + 4x = 2$

4 Solve the equation $x^2 - 6x = 15$ by completing the square.

5 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

6 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

7 Find the exact roots of $x^2 + 10x - 8 = 0$ by completing the square.

8 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.

9 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 6x - 41 = 0$. Express your answer in simplest radical form.

10 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

11 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$. State the value of c that creates a perfect square trinomial. Explain how the value of c is determined.

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Answer Section

1 ANS:

$x^2 - 8x + 16 = -41 + 16$

$(x-4)^2 = -25$

REF: 012431ai

2 ANS:

$x^2 + 8x + 16 = 33 + 16$

$(x+4)^2 = 49$

$x + 4 = \pm 7$

$x = -11, 3$

REF: 012528ai

3 ANS:

$x^2 + 4x + 4 = 2 + 4$

$(x+2)^2 = 6$

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

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

REF: 081830ai

4 ANS:

$x^2 - 6x + 9 = 15 + 9$

$(x-3)^2 = 24$

$x - 3 = \pm\sqrt{24}$

$x = 3 \pm 2\sqrt{6}$

REF: 081732ai

5 ANS:

$x^2 - 8x = 5$

$x^2 - 8x + 16 = 5 + 16$

$(x-4)^2 = 21$

$x - 4 = \pm\sqrt{21}$

$x = 4 \pm \sqrt{21}$

REF: 062232ai

6 ANS:

$$x^2 - 8x = -6$$

$$x^2 - 8x + 16 = -6 + 16$$

$$(x-4)^2 = 10$$

$$x - 4 = \pm\sqrt{10}$$

$$x = 4 \pm \sqrt{10}$$

REF: 012031ai

7 ANS:

$$x^2 + 10x + 25 = 8 + 25$$

$$(x+5)^2 = 33$$

$$x + 5 = \pm\sqrt{33}$$

$$x = -5 \pm \sqrt{33}$$

REF: 011636a2

8 ANS:

$$x^2 + 10x = 30$$

$$x^2 + 10x + 25 = 30 + 25$$

$$(x+5)^2 = 55$$

$$x + 5 = \pm\sqrt{55}$$

$$x = -5 \pm \sqrt{55}$$

REF: 062429ai

9 ANS:

$$x^2 + 6x + 9 = 41 + 9$$

$$(x+3)^2 = 50$$

$$x + 3 = \pm\sqrt{50}$$

$$x = -3 \pm 5\sqrt{2}$$

REF: fall2304ai

10 ANS:

$3 \pm \sqrt{7}$. $2x^2 - 12x + 4 = 0$

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

$$x^2 - 6x = -2$$

$$x^2 - 6x + 9 = -2 + 9$$

$$(x - 3)^2 = 7$$

$$x - 3 = \pm\sqrt{7}$$

$$x = 3 \pm \sqrt{7}$$

REF: fall0936a2

11 ANS:

Since $(x + p)^2 = x^2 + 2px + p^2$, p is half the coefficient of x, and the constant term is equal to p^2. $\left(\frac{6}{2}\right)^2 = 9$

REF: 081432ai