

A.REI.B.4: Solving Quadratics 4

- 1 Which step can be used when solving $x^2 - 6x - 25 = 0$ by completing the square?
 - 1) $x^2 - 6x + 9 = 25 + 9$
 - 2) $x^2 - 6x - 9 = 25 - 9$
 - 3) $x^2 - 6x + 36 = 25 + 36$
 - 4) $x^2 - 6x - 36 = 25 - 36$

- 2 When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?
 - 1) $(x - 4)^2 = 9$
 - 2) $(x - 4)^2 = 23$
 - 3) $(x - 8)^2 = 9$
 - 4) $(x - 8)^2 = 23$

- 3 Which equation has the same solution as $x^2 - 6x - 12 = 0$?
 - 1) $(x + 3)^2 = 21$
 - 2) $(x - 3)^2 = 21$
 - 3) $(x + 3)^2 = 3$
 - 4) $(x - 3)^2 = 3$

- 4 Which equation has the same solutions as $x^2 + 6x - 7 = 0$?
 - 1) $(x + 3)^2 = 2$
 - 2) $(x - 3)^2 = 2$
 - 3) $(x - 3)^2 = 16$
 - 4) $(x + 3)^2 = 16$

- 5 If $x^2 = 12x - 7$ is solved by completing the square, one of the steps in the process is
 - 1) $(x - 6)^2 = -43$
 - 2) $(x + 6)^2 = -43$
 - 3) $(x - 6)^2 = 29$
 - 4) $(x + 6)^2 = 29$

- 6 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be
 - 1) $(x + 3)^2 = 7$
 - 2) $(x - 3)^2 = 7$
 - 3) $(x - 3)^2 = 11$
 - 4) $(x - 6)^2 = 34$

- 7 The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?
 - 1) $(x - 3)^2 = 6$
 - 2) $(x - 3)^2 = -6$
 - 3) $(x - 3)^2 = 3$
 - 4) $(x - 3)^2 = -3$

- 8 What are the roots of the equation $x^2 + 4x - 16 = 0$?
 - 1) $2 \pm 2\sqrt{5}$
 - 2) $-2 \pm 2\sqrt{5}$
 - 3) $2 \pm 4\sqrt{5}$
 - 4) $-2 \pm 4\sqrt{5}$

- 9 What are the solutions to the equation $x^2 - 8x = 10$?
 - 1) $4 \pm \sqrt{10}$
 - 2) $4 \pm \sqrt{26}$
 - 3) $-4 \pm \sqrt{10}$
 - 4) $-4 \pm \sqrt{26}$

- 10 What are the solutions to the equation $x^2 - 8x = 24$?
- 1) $x = 4 \pm 2\sqrt{10}$
 - 2) $x = -4 \pm 2\sqrt{10}$
 - 3) $x = 4 \pm 2\sqrt{2}$
 - 4) $x = -4 \pm 2\sqrt{2}$
- 11 Which value of k will make $x^2 - \frac{1}{4}x + k$ a perfect square trinomial?
- 1) $\frac{1}{64}$
 - 2) $\frac{1}{16}$
 - 3) $\frac{1}{8}$
 - 4) $\frac{1}{4}$
- 12 Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?
- 1) $\frac{7}{2}$
 - 2) $\frac{49}{4}$
 - 3) $\frac{49}{2}$
 - 4) 49
- 13 When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?
- 1) $x^2 + 5x + 7 = 0$
 - 2) $x^2 + 5x + 3 = 0$
 - 3) $x^2 - 5x + 7 = 0$
 - 4) $x^2 - 5x + 3 = 0$
- 14 Solve the equation $x^2 - 6x = 15$ by completing the square.
- 15 Find the exact roots of $x^2 + 10x - 8 = 0$ by completing the square.
- 16 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.
- 17 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: 1 REF: 061408a2

2 ANS: 2

$$x^2 - 8x = 7$$

$$x^2 - 8x + 16 = 7 + 16$$

$$(x - 4)^2 = 23$$

REF: 011614ai

3 ANS: 2

$$x^2 - 6x = 12$$

$$x^2 - 6x + 9 = 12 + 9$$

$$(x - 3)^2 = 21$$

REF: 061408ai

4 ANS: 4

$$x^2 + 6x = 7$$

$$x^2 + 6x + 9 = 7 + 9$$

$$(x + 3)^2 = 16$$

REF: 011517ai

5 ANS: 3

$$x^2 = 12x - 7$$

$$x^2 - 12x = -7$$

$$x^2 - 12x + 36 = -7 + 36$$

$$(x - 6)^2 = 29$$

REF: 061505a2

6 ANS: 2

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

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

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

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

REF: 011116a2

7 ANS: 1

$$2(x^2 - 6x + 3) = 0$$

$$x^2 - 6x = -3$$

$$x^2 - 6x + 9 = -3 + 9$$

$$(x - 3)^2 = 6$$

REF: 011722ai

8 ANS: 2

$$x^2 + 4x = 16$$

$$x^2 + 4x + 4 = 16 + 4$$

$$(x + 2)^2 = 20$$

$$x + 2 = \pm\sqrt{4 \cdot 5}$$

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

REF: 061410ai

9 ANS: 2

$$x^2 - 8x + 16 = 10 + 16$$

$$(x - 4)^2 = 26$$

$$x - 4 = \pm\sqrt{26}$$

$$x = 4 \pm \sqrt{26}$$

REF: 061722ai

10 ANS: 1

$$x^2 - 8x + 16 = 24 + 16$$

$$(x - 4)^2 = 40$$

$$x - 4 = \pm\sqrt{40}$$

$$x = 4 \pm 2\sqrt{10}$$

REF: 061523ai

11 ANS: 1

$$\left(\frac{1}{2}\left(-\frac{1}{4}\right)\right)^2 = \frac{1}{64}$$

REF: 081527a2

12 ANS: 2

REF: 061122a2

13 ANS: 4

$$x^2 - 5x = -3$$

$$x^2 - 5x + \frac{25}{4} = \frac{-12}{4} + \frac{25}{4}$$

$$\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$$

REF: 061518ai

14 ANS:

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

$$(x - 3)^2 = 24$$

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

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

REF: 081732ai

15 ANS:

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

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

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

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

REF: 011636a2

16 ANS:

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

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

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

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

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

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

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

REF: fall0936a2

17 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