

### A.REI.B.4: Solving Quadratics 4

- Which value of  $k$  will make  $x^2 - \frac{1}{4}x + k$  a perfect square trinomial?
  - $\frac{1}{64}$
  - $\frac{1}{16}$
  - $\frac{1}{8}$
  - $\frac{1}{4}$
- 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?
  - $\frac{7}{2}$
  - $\frac{49}{4}$
  - $\frac{49}{2}$
  - 49
- If  $x^2 + 2 = 6x$  is solved by completing the square, an intermediate step would be
  - $(x + 3)^2 = 7$
  - $(x - 3)^2 = 7$
  - $(x - 3)^2 = 11$
  - $(x - 6)^2 = 34$
- Which step can be used when solving  $x^2 - 6x - 25 = 0$  by completing the square?
  - $x^2 - 6x + 9 = 25 + 9$
  - $x^2 - 6x - 9 = 25 - 9$
  - $x^2 - 6x + 36 = 25 + 36$
  - $x^2 - 6x - 36 = 25 - 36$
- If  $x^2 = 12x - 7$  is solved by completing the square, one of the steps in the process is
  - $(x - 6)^2 = -43$
  - $(x + 6)^2 = -43$
  - $(x - 6)^2 = 29$
  - $(x + 6)^2 = 29$
- When solving the equation  $x^2 - 8x - 7 = 0$  by completing the square, which equation is a step in the process?
  - $(x - 4)^2 = 9$
  - $(x - 4)^2 = 23$
  - $(x - 8)^2 = 9$
  - $(x - 8)^2 = 23$
- 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?
  - $(x - 3)^2 = 6$
  - $(x - 3)^2 = -6$
  - $(x - 3)^2 = 3$
  - $(x - 3)^2 = -3$
- 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?
  - $x^2 + 5x + 7 = 0$
  - $x^2 + 5x + 3 = 0$
  - $x^2 - 5x + 7 = 0$
  - $x^2 - 5x + 3 = 0$

- 9 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)  $(x - 3)^2 = 3$
- 10 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)  $(x + 3)^2 = 16$
- 11 Which equation is equivalent to  $y - 34 = x(x - 12)$ ?
- 1)  $y = (x - 17)(x + 2)$
  - 2)  $y = (x - 17)(x - 2)$
  - 3)  $y = (x - 6)^2 + 2$
  - 4)  $y = (x - 6)^2 - 2$
- 12 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)  $-4 \pm \sqrt{26}$
- 13 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)  $-2 \pm 4\sqrt{5}$
- 14 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)  $x = -4 \pm 2\sqrt{2}$
- 15 Solve the equation  $x^2 - 6x = 15$  by completing the square.
- 16 Find the exact roots of  $x^2 + 10x - 8 = 0$  by completing the square.
- 17 Solve  $2x^2 - 12x + 4 = 0$  by completing the square, expressing the result in simplest radical form.
- 18 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

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

REF: 081527a2

2 ANS: 2

REF: 061122a2

3 ANS: 2

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

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

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

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

REF: 011116a2

4 ANS: 1

REF: 061408a2

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

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

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

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

REF: 011614ai

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: 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

9 ANS: 2

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

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

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

REF: 061408ai

10 ANS: 4

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

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

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

REF: 011517ai

11 ANS: 4

$$y - 34 = x^2 - 12x$$

$$y = x^2 - 12x + 34$$

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

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

REF: 011607ai

12 ANS: 2

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

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

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

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

REF: 061722ai

13 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

14 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

15 ANS:

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

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

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

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

REF: 081732ai

16 ANS:

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

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

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

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

REF: 011636a2

17 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

18 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