A.REI.B.4: Solving Quadratics 6

1 The quadratic equation $x^2 - 6x = 12$ is rewritten in the form $(x + p)^2 = q$, where q is a constant. What is the value of p?
1) -12
2) -9
3) -3
4) 9

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

3 Which equation is equivalent to $x^2 - 6x + 4 = 0$?
1) $(x - 3)^2 = -4$
2) $(x - 3)^2 = 5$
3) $(x - 3)^2 = 6$
4) $(x - 3)^2 = 9$

4 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) $(x - 8)^2 = 23$

5 When solving $x^2 - 10x - 13 = 0$ by completing the square, which equation is a step in the process?
1) $(x - 5)^2 = 38$
2) $(x - 5)^2 = 12$
3) $(x - 10)^2 = 38$
4) $(x - 10)^2 = 12$

6 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) $x^2 - 6x - 36 = 25 - 36$

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

8 Which equation has the same solutions as $x^2 + 6x - 18 = 0$?
1) $(x + 3)^2 = 24$
2) $(x + 3)^2 = 27$
3) $(x + 6)^2 = 24$
4) $(x + 6)^2 = 27$

9 Which equation has the same solution as $x^2 + 8x - 33 = 0$?
1) $(x + 4)^2 = 49$
2) $(x - 4)^2 = 49$
3) $(x + 4)^2 = 17$
4) $(x - 4)^2 = 17$

10 When using the method of completing the square, which equation is equivalent to $x^2 - 12x - 10 = 0$?
1) $(x + 6)^2 = -26$
2) $(x + 6)^2 = 46$
3) $(x - 6)^2 = -26$
4) $(x - 6)^2 = 46$

11 When completing the square for $x^2 - 18x + 77 = 0$, which equation is a correct step in this process?
1) $(x-9)^2 = 4$
2) $(x-3)^2 = 2$
3) $x = \pm 13$
4) $x - 9 = \pm 9$

12 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) $(x+6)^2 = 29$

13 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) $(x-6)^2 = 34$

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

15 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) $-2 \pm 4\sqrt{5}$

16 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) $-4 \pm \sqrt{26}$

17 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) $x = -4 \pm 2\sqrt{2}$

18 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) $\frac{1}{4}$

19 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

20 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) $x^2-5x+3=0$

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

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

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

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

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

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

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

28 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.

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

30 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: 3

$x^2 - 6x = 12$

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

$(x-3)^2 = 21$

REF: 061812ai

2 ANS: 2

$x^2 - 6x = 12$

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

$(x-3)^2 = 21$

REF: 061408ai

3 ANS: 2

$x^2 - 6x + 9 = -4 + 9$

$x^2 - 6x + 9 = 5$

$(x-3)^2 = 5$

REF: 082320ai

4 ANS: 2

$x^2 - 8x = 7$

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

$(x-4)^2 = 23$

REF: 011614ai

5 ANS: 1

$x^2 - 10x + 25 = 13 + 25$

$(x-5)^2 = 38$

REF: 082215ai

6 ANS: 1 REF: 061408a2

7 ANS: 4

$x^2 + 6x = 7$

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

$(x+3)^2 = 16$

REF: 011517ai

8 ANS: 2

$x^2 + 6x = 18$

$x^2 + 6x + 9 = 18 + 9$

$(x+3)^2 = 27$

REF: 082408ai

9 ANS: 1

$x^2 + 8x = 33$

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

$(x+4)^2 = 49$

REF: 011915ai

10 ANS: 4

$x^2 - 12x + 36 = 10 + 36$

$(x-6)^2 = 46$

REF: 012319ai

11 ANS: 1

$x^2 - 18x + 81 = -77 + 81$

$(x-9)^2 = 4$

REF: 062306ai

12 ANS: 3

$x^2 = 12x - 7$

$x^2 - 12x = -7$

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

$(x-6)^2 = 29$

REF: 061505a2

13 ANS: 2

$x^2 + 2 = 6x$

$x^2 - 6x = -2$

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

$(x-3)^2 = 7$

REF: 011116a2

14 ANS: 1

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

$x^2 - 6x = -3$

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

$(x - 3)^2 = 6$

REF: 011722ai

15 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

16 ANS: 2

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

$(x - 4)^2 = 26$

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

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

REF: 061722ai

17 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

18 ANS: 1

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

REF: 081527a2

19 ANS: 2 REF: 061122a2

20 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

21 ANS:

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

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

REF: 012431ai

22 ANS:

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

$$(x+2)^2 = 6$$

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

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

REF: 081830ai

23 ANS:

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

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

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

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

REF: 081732ai

24 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

25 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

26 ANS:

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

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

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

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

REF: 011636a2

27 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

28 ANS:

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

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

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

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

REF: fall2304ai

29 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

30 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