



2-5 Additional Practice

Completing the Square

Solve each equation by first finding the principle square root of each side.

1. $x^2 + 12x + 36 = 25$

$$x = -11, x = -1$$

2. $x^2 - 10x + 25 = 144$

$$x = 17, x = -7$$

3. $x^2 + 6x + 9 = \frac{49}{4}$

$$x = \frac{1}{2}, x = -\frac{13}{2}$$

4. $x^2 - 22x + 121 = 225$

$$x = -4, x = 26$$

Rewrite each equation in the form $(x - p)^2 = q$

5. $x^2 + 4x + 3 = 0$

$$(x + 2)^2 = 1$$

6. $x^2 - 6x + 13 = 0$

$$(x - 3)^2 = -4$$

Solve each quadratic equation by completing the square.

7. $x^2 + 10x - 1 = 0$

$$x = -5 \pm \sqrt{26}$$

8. $x^2 + 2x - 7 = 0$

$$x = -1 \pm 2\sqrt{2}$$

9. $-x^2 + 6x + 10 = 0$

$$x = 3 \pm \sqrt{19}$$

10. $x^2 + 5x = 3x + 11$

$$x = -1 \pm 2\sqrt{3}$$

Write each equation in vertex form.

11. $y = x^2 - 6x + 4$

$$y = (x - 3)^2 - 5$$

12. $y = x^2 + 14x + 50$

$$y = (x + 7)^2 + 1$$

13. $y = 3x^2 + 8x + 2$

$$y = 3\left(x + \frac{4}{3}\right)^2 - \frac{10}{3}$$

14. $y = -2x^2 + 6x - 2$

$$y = -2\left(x - \frac{3}{2}\right)^2 + \frac{5}{2}$$

15. The quadratic equation $d = -t^2 + 4t + 33$ models the depth of water, d , in feet in a flood channel t hours after a rainstorm.

a. Solve the equation $-t^2 + 4t + 33 = 0$. $t = 2 \pm \sqrt{37}$

- b. Approximate the positive solution found in part (a) to two decimal places. **8.08**

- c. Interpret the answer to part (b) in terms of the problem.

The depth of the water is 0 feet 8.08 hours after the rainstorm.

16. While in orbit, a space scientist measures the pressure inside a container as it is being heated and then cooled. She records the information and discovers the pressure, p , in pounds per square inch, is related to the time, t , in minutes after the experiment began according to the equation $p = -0.2t^2 + 1.6t$. After how many seconds is the pressure in the container the greatest? **After 4 seconds**