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Practice 10-4

Factoring to Solve Quadratic Equations

1. Suppose you are building a storage box of volume 4368 in.^{3}. The length of the box will be 24 in. The height of the box will be 1 in. more than its width. Find the height and width of the box.

2. A banner is in the shape of a right triangle of area 63 in.^{2}. The height of the banner is 4 in. less than twice the width of the banner. Find the height and width of the banner.

3. A rectangular poster has an area of 190 in.^{2}. The height of the poster is 1 in. less than twice its width. Find the dimensions of the poster.

4. A diver is standing on a platform 24 ft above the pool. He jumps from the platform with an initial upward velocity of 8 ft/s. Use the formula $h = -16t^2 + vt + s$, where h is his height above the water, t is the time, v is his starting upward velocity, and s is his starting height. How long will it take for him to hit the water?

Solve each equation.

5. $(x - 9)(x + 8) = 0$

6. $x - 9x - 10 = 0$

7. $(c - 21)(c + 21) = 0$

8. $(x - 12)(5x - 13) = 0$

9. $2a^2 - 21a - 65 = 0$

10. $x^2 + 6x - 91 = 0$

11. $a^2 + 6a - 72 = 0$

12. $4x^2 + 8x - 21 = 0$

13. $20d^2 - 82d + 80 = 0$

14. $3n^2 + 12n - 288 = 0$

15. $2s^2 - 13s - 24 = 0$

16. $x^2 + 5x = 150$

17. $3c^2 + 8c = 3$

18. $30a^2 + 121a - 21 = 0$

19. $c^2 - 81 = 0$

20. $x^2 + 306 = -35x$

21. $x^2 = 121$

22. $x^2 - 21x + 108 = 0$