

In 1–12, solve the equation by completing the square.

1.  $x^2 + 10x - 4 = 0$

2.  $x^2 + 6x - 1 = 0$

3.  $x^2 - 8x + 3 = 0$

4.  $x^2 - 6x - 8 = 0$

5.  $x^2 + 12x - 3 = 0$

6.  $x^2 + 4x + 2 = 0$

7.  $x^2 - 10x + 4 = 0$

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

9.  $2x^2 + 8x - 6 = 0$

10.  $2x^2 - 16x + 4 = 0$

11.  $3x^2 + 12x - 6 = 0$

12.  $5x^2 - 10x - 20 = 0$

In 13–24, use the most convenient method to solve the equation.

13.  $x^2 - 7x + 12 = 0$

14.  $9x^2 - 27x = 0$

15.  $3x^2 - 15 = 0$

16.  $x^2 + 4x - 4 = 0$

17.  $9x^2 + 2 = 27$

18.  $2x^2 + x - 3 = 0$

19.  $2x^2 + 8x + 3 = 10$

20.  $3x^2 + 4x - 2 = 0$

21.  $5x^2 - x - 2 = 0$

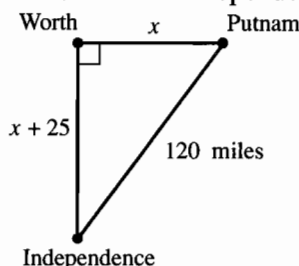
22.  $6x^2 + 11x = -3$

23.  $x^2 - 20x + 60 = 0$

24.  $x^2 + 5 = 7x$

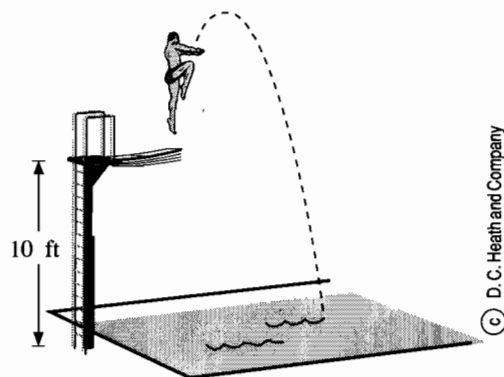
**25. Population Growth** In 1990, the populations of two neighboring towns were 20,000. From 1990 to 1992, the population of one town grew exponentially. In 1992, its population was 24,200. The population of the second town also grew exponentially, but at a rate 2% slower per year than the first town. What was the population of the second town in 1992?

**26. Distance** Worth, Missouri is 25 miles more north of Independence, Missouri than it is west of Putnam, Missouri. The distance between Independence and Putnam is approximately 120 miles. Find the distance between Putnam and Worth and the distance between Worth and Independence.



**27. Diver** The path followed by a diver can be modeled by  $h = -\frac{1}{6}(x^2 - 5x - 66)$  where  $h$  is the height (in feet) and  $x$  is the horizontal distance (in feet) from the edge of the pool. How far from the edge of the pool is the diver when he hits the water?

**28. Tunnel Length** A tunnel goes through a mountain whose shape can be modeled by  $h = -64x^2 + 16x$  where  $h$  is the height (in miles) and  $x$  is the distance (in miles) from the opening of the tunnel. Find the length of the tunnel.



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