

**Example 1** Use the Distributive Property to factor each polynomial.

15.  $16t - 40y$

16.  $30v + 50x$

17.  $2k^2 + 4k$

18.  $5z^2 + 10z$

19.  $4a^2b^2 + 2a^2b - 10ab^2$

20.  $5c^2v - 15c^2v^2 + 5c^2v^3$

**Examples 2–3** Factor each polynomial.

21.  $fg - 5g + 4f - 20$

22.  $a^2 - 4a - 24 + 6a$

23.  $hj - 2h + 5j - 10$

24.  $xy - 2x - 2 + y$

25.  $45pq - 27q - 50p + 30$

26.  $24ty - 18t + 4y - 3$

27.  $3dt - 21d + 35 - 5t$

28.  $8r^2 + 12r$

29.  $21th - 3t - 35h + 5$

30.  $vp + 12v + 8p + 96$

31.  $5br - 25b + 2r - 10$

32.  $2nu - 8u + 3n - 12$

33.  $5gf^2 + g^2f + 15gf$

34.  $rp - 9r + 9p - 81$

35.  $27cd^2 - 18c^2d^2 + 3cd$

36.  $18r^3t^2 + 12r^2t^2 - 6r^2t$

37.  $48tu - 90t + 32u - 60$

38.  $16gh + 24g - 2h - 3$

**Example 4** Solve each equation. Check your solutions.

39.  $3b(9b - 27) = 0$

40.  $2n(3n + 3) = 0$

41.  $(8z + 4)(5z + 10) = 0$

42.  $(7x + 3)(2x - 6) = 0$

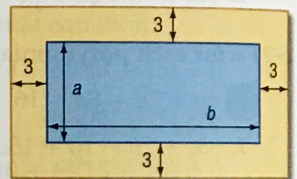
43.  $b^2 = -3b$

44.  $a^2 = 4a$

**Example 5**

45. **CCSS SENSE-MAKING** Use the drawing at the right.

- Write an expression in factored form to represent the area of the blue section.
- Write an expression in factored form to represent the area of the region formed by the outer edge.
- Write an expression in factored form to represent the yellow region.



46. **FIREWORKS** A ten-inch fireworks shell is fired from ground level. The height of the shell in feet is given by the formula  $h = 263t - 16t^2$ , where  $t$  is the time in seconds after launch.
- Write the expression that represents the height in factored form.
  - At what time will the height be 0? Is this answer practical? Explain.
  - What is the height of the shell 8 seconds and 10 seconds after being fired?
  - At 10 seconds, is the shell rising or falling?
47. **ARCHITECTURE** The frame of a doorway is an arch that can be modeled by the graph of the equation  $y = -3x^2 + 12x$ , where  $x$  and  $y$  are measured in feet. On a coordinate plane, the floor is represented by the  $x$ -axis.
- Make a table of values for the height of the arch if  $x = 0, 1, 2, 3,$  and  $4$  feet.
  - Plot the points from the table on a coordinate plane and connect the points to form a smooth curve to represent the arch.
  - How high is the doorway?

