SOLVING QUADRATIC EQUATIONS **Solve the quadratic equation using any method. Round your solutions to the nearest hundredth, if necessary.**

34. $-2x^2 = -32$

35. $x^2 - 8x = -16$

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

37. $x^2 = 12x - 36$

38. $x^2 + 4x = 9$

39. $-4x^2 + x = -17$

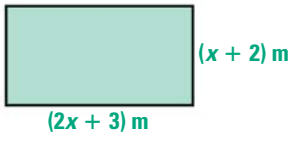
40. $11x^2 - 1 = 6x^2 + 2$

41. $-2x^2 + 5 = 3x^2 - 10x$

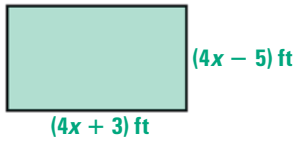
42. $(x + 13)^2 = 25$

GEOMETRY **Use the given area A of the rectangle to find the value of x. Then give the dimensions of the rectangle.**

43. $A = 91$ m^2



44. $A = 209$ ft^2



45. **CHALLENGE** The solutions of the quadratic equation $ax^2 + bx + c = 0$ are $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$ and $x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$. Find the mean of the solutions. How is the mean of the solutions related to the graph of $y = ax^2 + bx + c$? *Explain.*

PROBLEM SOLVING

EXAMPLE 3 on p. 672 for Exs. 46–47

46. **ADVERTISING** For the period 1990–2000, the amount of money y (in billions of dollars) spent on advertising in the U.S. can be modeled by the function $y = 0.93x^2 + 2.2x + 130$ where x is the number of years since 1990. In what year was 164 billion dollars spent on advertising?

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47. **CELL PHONES** For the period 1985–2001, the number y (in millions) of cell phone service subscribers in the U.S. can be modeled by the function $y = 0.7x^2 - 4.3x + 5.5$ where x is the number of years since 1985. In what year were there 16,000,000 cell phone service subscribers?

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48. **MULTI-STEP PROBLEM** A football is punted from a height of 2.5 feet above the ground and with an initial vertical velocity of 45 feet per second.

a. Use the vertical motion model to write an equation that gives the height h (in feet) of the football as a function of the time t (in seconds) after it has been punted.

b. The football is caught 5.5 feet above the ground as shown in the diagram. Find the amount of time that the football is in the air.