NAME _____ DATE _____ PERIOD _____

8-6 Word Problem Practice

Solving $x^2 + bx + c = 0$

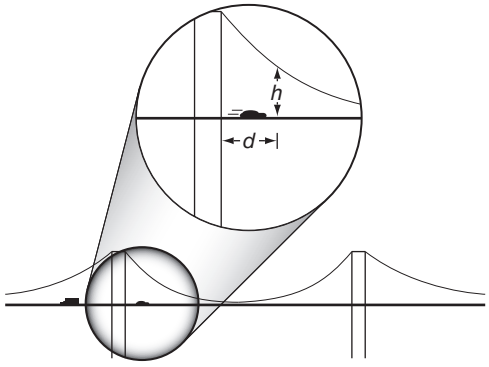
1. COMPACT DISCS A compact disc jewel case has a width 2 centimeters greater than its length. The area for the front cover is 168 square centimeters. The first two steps to finding the value of x are shown below. Solve the equation and find the length of the case.

$$Length \times width = area$$
$$x(x + 2) = 168$$
$$x^2 + 2x - 168 = 0$$

−14 or 12; 12 cm

2. MATH GAMES Fiona and Greg play a number guessing game. Greg gives Fiona this hint about his two secret numbers, "The product of the two consecutive positive integers that I am thinking of is 11 more than their sum." What are Greg's numbers? **4 and 5**

3. BRIDGE ENGINEERING A car driving over a suspension bridge is supported by a cable hanging between the ends of the bridge. Since its shape is parabolic, it can be modeled by a quadratic equation. The height above the road bed of a bridge's cable h in inches measured at distance d in yards from the first tower is given by $h = d^2 - 36d + 324$.



If the driver of a car looks out at a height of 49 inches above the roadbed, at what distance(s) from the tower will the driver's eyes be at the same height as the cable? **at 11 and 25 yds from the first tower**

4. PHYSICAL SCIENCE The boiling point of water depends on altitude. The following equation approximates the number of degrees D below 212°F at which water will boil at altitude h.

$$D^2 + 520D = h$$

In Denver, Colorado, the altitude is approximately 5300 feet above sea level. At approximately what temperature does water boil in Denver?

***D* = 10° drop**
The boiling point is about 202°F.

5. MONUMENTS Susan is designing a pyramidal stone monument for a local park. The design specifications tell her that the height needs to be 9 feet, the width of the base must be 5 feet less than the length, and the volume should be 150 cubic feet. Recall that the volume of a pyramid is given by $V = \frac{1}{3}Bh$, where B is the area of the base and h is the height.

a. Write and solve an equation to find the width of the base of the monument.

$150 = \frac{1}{3}w(w + 5) \cdot 9$ or $3w^2 + 15w - 150 = 0$; $w = \{5, -10\}$

b. Interpret each answer in terms of the situation. ***w* = 5: the width of the pyramid is 5 feet; *w* = −10: negative length doesn't make sense in the situation.**