8-5 Word Problem Practice Using the Distributive Property

NAME

- 1. PHYSICS According to legend, Galileo dropped objects of different weights from the so-called "leaning tower" of Pisa while developing his formula for free falling objects. The relationship that he discovered was that the distance d an object falls after t seconds is given by $d = 16t^2$ (ignoring air resistance). This relationship can be found in the equation $h = 32t - 16t^2$, where *h* is the height of an object thrown upward from ground level at a rate of 32 feet per second. Solve the equation for h = 0.
- 4. VERTICAL JUMP Your vertical jump height is measured by subtracting your standing reach height from the height of the highest point you can reach by jumping without taking a running start. Typically, NBA players have vertical jump heights of up to 34 inches. If an NBA player jumps this high, his height h in inches above his standing reach height after t seconds can be modeled by $h = 162t - 192t^2$. Solve the equation for h = 0 and interpret the solution. Round your answer to the nearest hundredth.

- 2. SWIMMING POOL The area A of a rectangular swimming pool is given by the equation $A = 12w - w^2$, where w is the width of one side. Write an expression for the other side of the pool.
- 5. PETS Conner tosses a dog treat upward with an initial velocity of 13.7 meters per second. The height of the treat above the dog's mouth h in meters after t seconds is given by $h = 13.7t - 4.9t^2$.
 - **a.** Assuming the dog doesn't jump, after how many seconds does the dog catch the treat?
 - **b.** The dog treat reaches its maximum height halfway between when it was thrown and when it was caught. What is its maximum height?
 - c. How fast would Connor have to throw the dog treat in order to make it fly through the air for 6 seconds?

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- **3. CONSTRUCTION** Unique Building Company is constructing a triangular roof truss for a building. The workers assemble the truss with the dimensions shown on the diagram below. Using the Pythagorean

Theorem, find the length of the sides of the truss.

- 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 expression $x^2 + 2x 168$ represents the area of the compact disc jewel case. Factor the expression.
- **4. BREAK EVEN** Breaking even occurs when the revenues for a business equal the cost. A local children's museum studied their costs and revenues from paid admission. They found that their break-even time is given by the expression $2h^2 2h 24$, where *h* is the number of hours the museum is open per day. Factor the expression.
- **2. CARPENTRY** Miko wants to build a toy box for her sister. The expression $2x^2 6x 80$ represents the volume of the toy box. Factor the expression.
- **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 $d^2 36d + 324$. Factor the expression.



- 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. The expression $3x^2$ -15x - 150 represents the volume of the pyramidal stone monument.
 - **a.** Factor the expression that represents the volume of the pyramidal stone monument.

b. What do each of the factored expression represent?