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## 8-5 Word Problem Practice Using the Distributive Property

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 $d=16 t^{2}$ (ignoring air resistance). This relationship can be found in the equation $h=32 t-16 t^{2}$, 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 $h=0$.
2. SWIMMING POOL The area $A$ of a rectangular swimming pool is given by the equation $A=12 w-w^{2}$, where $w$ is the width of one side. Write an expression for the other side of the pool.
3. 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 $h=162 t-192 t^{2}$. Solve the equation for $h=0$ and interpret the solution. Round your answer to the nearest hundredth.
4. 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 $h=13.7 t-4.9 t^{2}$.
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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## 8-6 Word Problem Practice Factoring Quadratic Trinomials

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 $x^{2}+2 x-168$ represents the area of the compact disc jewel case. Factor the expression.
2. CARPENTRY Miko wants to build a toy box for her sister. The expression $2 x^{2}-6 x-80$ 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 $d^{2}-36 d+324$. 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 $2 h^{2}-2 h-24$, where $h$ is the number of hours the museum is open per day. 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 $3 x^{2}$ $-15 x-150$ 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?
