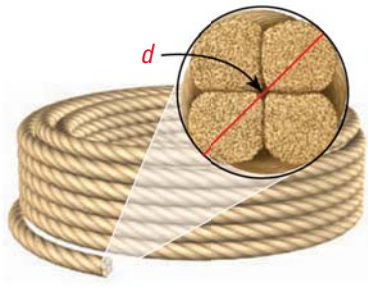
**REVIEW VERTICAL MOTION**
For help with the vertical motion model, see p. 575.

**42. FALLING OBJECTS** Two acorns drop from an oak tree. One falls 45 feet, while the other falls 32 feet.

**a.** For each acorn, write an equation that gives the height $h$ (in feet) of the acorn as a function of the time $t$ (in seconds) it has fallen.

**b.** *Describe* how the graphs of the two equations are related.

**43. TAKS REASONING** The breaking strength $w$ (in pounds) of a manila rope can be modeled by the function $w = 8900d^2$ where $d$ is the diameter (in inches) of the rope.




**a.** Graph the function.

**b.** If a manila rope has 4 times the breaking strength of another manila rope, does the rope have 4 times the diameter of the other rope? *Explain*.

**44. TAKS REASONING** For an engineering contest, you have to create a container for an egg so that the container can be dropped from a height of 30 feet without breaking the egg.

**a.** The distance $y$ (in feet) that the container falls is given by the function $y = 16t^2$ where $t$ is the time (in seconds) the container has fallen. Graph the function.

**b.** The height $y$ (in feet) of the dropped container is given by the function $y = -16t^2 + 30$ where $t$ is the time (in seconds) since the container is dropped. Graph the function.

**c.** How are the graphs from part (a) and part (b) related? *Explain* how you can use each graph to find the number of seconds after which the container has fallen 10 feet.

Animated Algebra at classzone.com

**45. CHALLENGE** The kinetic energy $E$ (in joules) of an object in motion is given by $E = \frac{1}{2}mv^2$ where $m$ is the object's mass (in kilograms) and $v$ is the object's velocity (in meters per second). Suppose a baseball has 918.75 joules of energy when traveling 35 meters per second. Use this information to write and graph an equation that gives the energy $E$ of the baseball as a function of its velocity $v$.

## MIXED REVIEW FOR TAKS

TAKS PRACTICE at classzone.com

**REVIEW**
Lesson 7.1; TAKS Workbook

**46. TAKS PRACTICE** A fence that measures 72 feet in length encloses a rectangular patch of grass. The patch of grass has an area of 300 square feet. Which system of equations can be used to find $\ell$, the length in feet of the patch of grass, and $w$, the width in feet of the patch of grass?

*TAKS Obj. 4*

(A) $2\ell + 2w = 144$, $\ell w = 300$

(B) $2\ell + 2w = 72$, $300\ell = w$

(C) $2\ell + 2w = 72$, $\ell w = 300$

(D) $2\ell + 2w = 144$, $4\ell w = 300$



EXTRA PRACTICE for Lesson 10.1, p. 947

ONLINE QUIZ at classzone.com