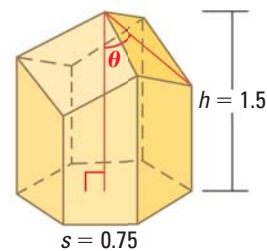


43. **MULTIPLE REPRESENTATIONS** The surface area  $S$  of a honeycomb cell can be estimated by the equation shown at the right. In the equation,  $h$  is the height (in inches),  $s$  is the width of a side (in inches), and  $\theta$  is the angle (in degrees) indicated in the diagram.



$$S = 6hs + \frac{3}{2}s^2 \left( \frac{\sqrt{3} - \cos \theta}{\sin \theta} \right)$$

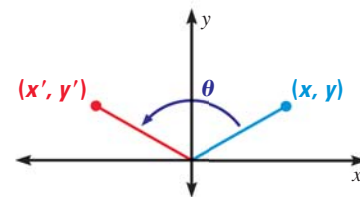
- Using a Diagram** Use the values of  $h$  and  $s$  in the diagram to simplify the equation.
  - Making a Table** Use a graphing calculator to make a table for the function from part (a). For what value(s) of  $\theta$  does  $S = 9$  square inches?
  - Drawing a Graph** Use a graphing calculator to graph the function from part (a). What value of  $\theta$  minimizes the surface area?
44. **TAKS REASONING** The power  $P$  (in watts) used by a microwave oven is the product of the voltage  $V$  (in volts) and the current  $I$  (in amperes). Suppose the voltage and current can be modeled by

$$V = 170 \cos 120\pi t \quad \text{and} \quad I = 11.3 \cos 120\pi t$$

where  $t$  is the time (in seconds).

- Model** Write the function  $P(t)$  for the power used by the microwave.
- Solve** At what times does the microwave use 375 watts of power?
- Graphing Calculator** Graph the function  $P(t)$ . Describe how the graph differs from that of a cosine function of the form  $y = a \cos bt$ .

45. **CHALLENGE** Matrix multiplication can be used to rotate a point  $(x, y)$  counterclockwise about the origin through an angle  $\theta$ . The coordinates of the resulting point  $(x', y')$  are determined by the matrix equation shown at the right.



$$\begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} x' \\ y' \end{bmatrix}$$

- The point  $(2, 3)$  is rotated counterclockwise about the origin through an angle of  $\frac{\pi}{3}$ . What are the coordinates of the resulting point?
- Through what angle  $\theta$  must the point  $(6, 2)$  be rotated to produce  $(x', y') = (3\sqrt{3} - 1, \sqrt{3} + 3)$ ?



## MIXED REVIEW FOR TAKS

**TAKS PRACTICE** at classzone.com

### REVIEW

Lesson 2.4;  
TAKS Workbook

46. **TAKS PRACTICE** The speed of a falling object increases 32 feet per second each second it falls. From a high cliff, Andrew throws an object downward with an initial speed of 8 feet per second. Which equation represents the speed  $s$  (in feet per second) of the falling object after  $t$  seconds? **TAKS Obj. 1**

- (A)  $s = -32t + 8$                       (B)  $s = 32t + 8$   
(C)  $s = 8t + 32$                         (D)  $s = 32t$

### REVIEW

Lesson 2.3;  
TAKS Workbook

47. **TAKS PRACTICE** What are the coordinates of the  $y$ -intercept of the graph of  $-3x + 4y = 24$ ? **TAKS Obj. 3**

- (F)  $(-8, 0)$                                 (G)  $(0, \frac{4}{3})$   
(H)  $(0, 6)$                                 (J)  $(0, 8)$