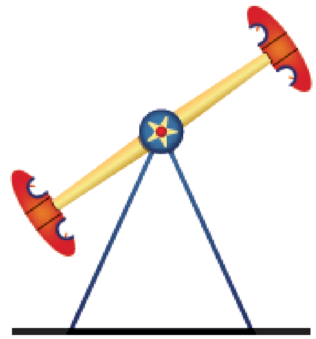
Practice 6.2.2

5 One of the scarier rides at carnivals and amusement parks is provided by a long rotating arm with riders in capsules on either end. Of course, the capsules not only move up and down as the arm rotates, but they spin other ways as well.

Suppose that the arm of one such ride is 150 feet long and that you get strapped into one of the capsules when it is at ground level. Assume simple rotating motion and treat the capsule as a single point. Find your height above the ground when the arm has made the following rotations counterclockwise from its starting vertical position.



a. 20° **b.** 45°

c. 85° **d.** 90°

e. 120° **f.** 180°

g. 270° **h.** 300°

i. 340°

6 Radio direction and ranging (radar) is one of the most widely used electronic sensing tools. Most of us probably know about radar from its applications in measuring speed of baseball pitches and automobiles. But it is also an invaluable tool in navigation and weather forecasting.

In those applications, the echoes to a rotating transmitter/receiver are displayed as blips on a scope. Each blip is located by distance and angle.

To describe locations of radar blips by distance east/west and north/south of the radar device, the (*distance, angle*) information needs to be converted to rectangular (x, y) coordinates.

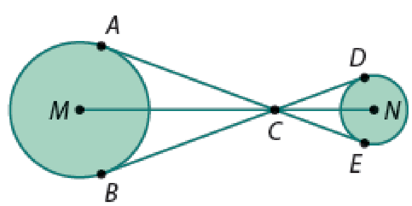
Find the (x, y) coordinates of radar blips located by the following (*distance, angle*) data.

a. (30 km, 40°) **b.** (20 km, 160°)

c. (70 km, 210°) **d.** (15 km, 230°)

e. (45 km, 270°) **f.** (40 km, 310°)

28 In the figure at the right, $\overline{AE}$ and $\overline{BD}$ are tangent to both circles. The point of intersection of the two tangents lies on the line containing the centers of the circles.



a. Draw the radii to the points of tangency in each circle. The result should be four triangles that are similar to one another. Explain why?

b. Suppose the radius of the larger circle is 8 cm, the radius of the smaller circle is 4 cm, and the distance between the centers is 30 cm. Use similar triangles to determine the length of a common tangent segment.

c. Suppose the circles represent pulleys with a belt going around the pulleys as indicated by the common tangents. Given the measures in Part c, determine the length of the belt.

37 Solve each equation for the indicated variable.

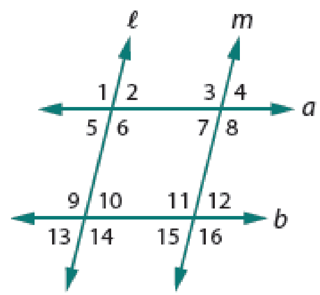
a. $C = 2\pi r$ for r

b. $A = \frac{1}{2}h(b_1 + b_2)$ for b_2

c. $E = mc^2$ for c

d. $d = \frac{m}{v}$ for v

39 Using the diagram at the right, determine, for each set of conditions, whether the conditions imply that any pairs of lines are parallel. If so, indicate which lines are parallel.



a. $m\angle 9 = m\angle 11$

b. $m\angle 13 = m\angle 7$

c. $m\angle 3 = m\angle 16$

d. $m\angle 1 + m\angle 12 = 180°$ and $m\angle 9 = m\angle 11$