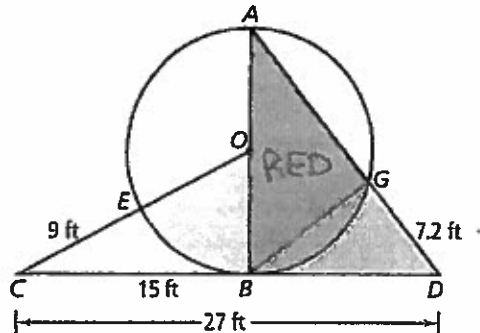


# Chapter 11 – Performance Task

## Determining the Dimensions of a Logo

The logo of the Sunshine Sailboat Company features several triangular sails in front of a circular sun. The company plans to make a large version of the logo for a showroom display, as shown in the diagram below. The red sail will be made of copper. In the diagram,  $\overline{CD}$  is tangent to  $\odot O$  at point  $B$ .



### Task Description

Determine the area of the copper needed for the red sail in the logo for the showroom display.

Do all work on your own paper.

- Step 1:
- What can you conclude about  $\angle OBC$ ? Justify your answer.
  - Write and solve an equation to find the length of  $\overline{OE}$ .
  - Explain how you know your answer to part (b) is reasonable.
  - How can you use the length you found in part (b) to find the length of one side of the red sail in the logo for the showroom display? What is that length?

Step 2: Consider relationships of angles and arcs in the diagram. Select all of the following that are true. Explain your reasoning.

- $\angle ADB$  is an inscribed angle in  $\odot O$ .
- $\angle AGB$  is an inscribed angle in  $\odot O$ .
- $\angle AGB$  intercepts  $\widehat{GB}$ .
- $\angle AGB$  intercepts  $\widehat{AEB}$ .
- The measure of  $\widehat{AG}$  is half the measure of  $\angle AGB$ .
- $\triangle AGB$  is a right triangle.
- $\triangle ABG \sim \triangle BDG$

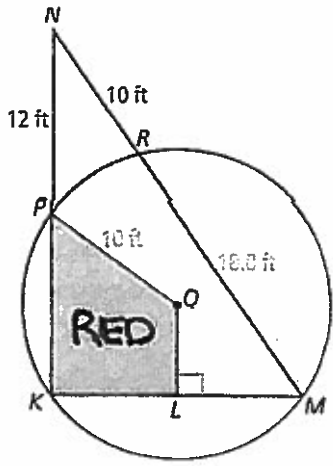
- Step 3:
- Name each segment in the diagram that is neither a chord nor a radius of  $\odot O$ . Which of these segments is a secant?
  - In Step 1, you found the length of one side of the red sail in the logo. Use the secant you identified in part (a) and a tangent to write and solve an equation to find the length of another side of the red sail in the logo.
  - Does the length you found in part (b) make sense given everything you know so far about the figure in the diagram? Explain.

Step 4: Use the work you did to complete the following.

Solve the problem in the Task Description by determining the area of the copper needed for the red sail in the logo for the showroom display. Show all your work and explain each step of your solution.

**On Your Own**

The Sunshine Sailboat Company is considering an alternate logo for their showroom display. This logo consists of one triangular sail against a circular sun, as shown in the diagram below. Part of the sail is a red trapezoid, which would be made of copper. In the diagram,  $Q$  is the center of the circle, and  $\overline{PK}$  and  $\overline{QL}$  are the bases of the red trapezoid.



Determine the area of the copper needed for the red part of the sail in the logo for the showroom display. Round your answer to the nearest square foot.

## Chapter 11 Performance Task

Step 1 a.  $m\angle OBC = 90$

b.  $w_0 = t^2$

$$(2r + 9)(9) = 15^2$$

$$18r + 81 = 225$$

$$18r = 144$$

$$r = 8 \quad OE = 8'$$

c. makes 8-15-17 rt  $\triangle$

d.  $\overline{OE}$  is radius;  $\overline{AB}$  is diameter,  $AB = 16'$

Step 2 True: B, D, F (intercepts  $180^\circ$  arc), G (SSS  $\sim$

$$\frac{16}{12} = \frac{12.8}{9.6} = \frac{9.6}{7.2}$$

False:

A. vertex not on circle

or both are  $\sim$  to  $\triangle ABD$

C.  $\angle AGB$  intercepts  $\widehat{AEB}$

E. measure of  $\widehat{AEB}$  is  $\frac{1}{2} m\angle AGB$

Step 3 a.  $\overline{CE}, \overline{CO}, \overline{CB}, \overline{CP}, \overline{BD}, \overline{CH}$  (secant),  $\overline{AD}$  (secant),  $\overline{GD}$

(added pt to picture)

b.  $w_0 = t^2$

$$(AG + 7.2)(7.2) = 12^2$$

$$7.2AG + 51.84 = 144$$

$$7.2AG = 92.16$$

$$AG = 12.8'$$

c. yes, diameter is 16,  $AG < 16$

Step 4

$$A = \frac{1}{2}bh$$
$$= \frac{1}{2}(9.6)(12.8)$$
$$= 61.44 \text{ ft}^2$$

On Your Own

$$\omega_0 = \omega_0$$
$$(12+x)(12) = (28.8)(10)$$
$$144 + 12x = 288$$
$$12x = 144$$
$$x = 12$$

Using  $p \cdot p = p \cdot p$

$$KL \cdot LM = SL \cdot LT$$
$$8 \cdot 8 = (10+y)(10-y)$$
$$64 = 100 - y^2$$
$$y^2 = 36$$
$$y = 6$$

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

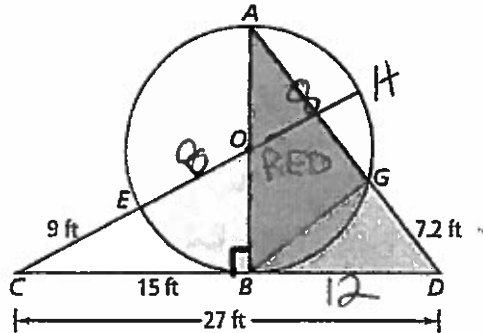
$$A = \frac{1}{2}(6 + 12)(8)$$

$$A = 72 \text{ ft}^2$$

# Chapter 11 - Performance Task

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### Task Description

Determine the area of the copper needed for the red sail in the logo for the showroom display.

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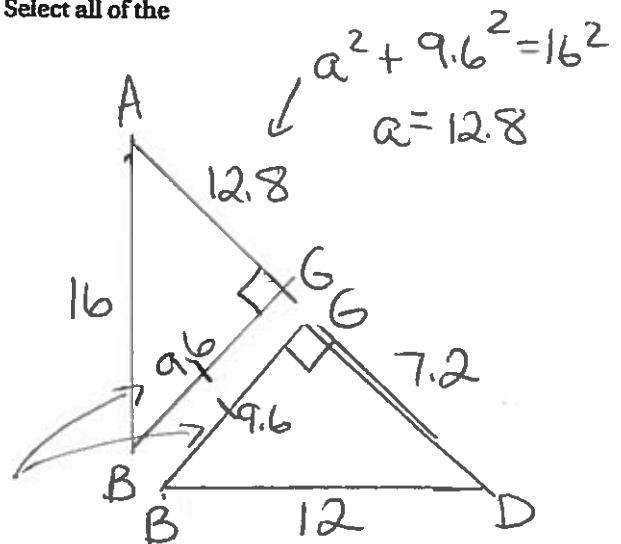
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$$a^2 + 7.2^2 = 12^2$$

$$a = 9.6$$



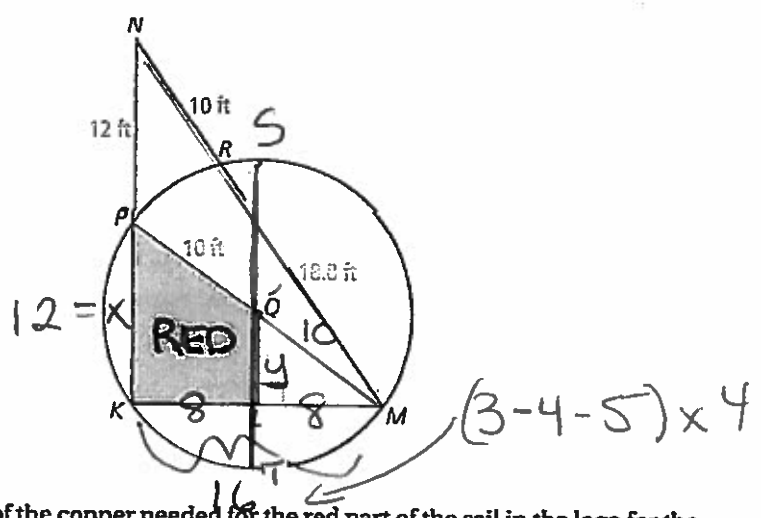
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