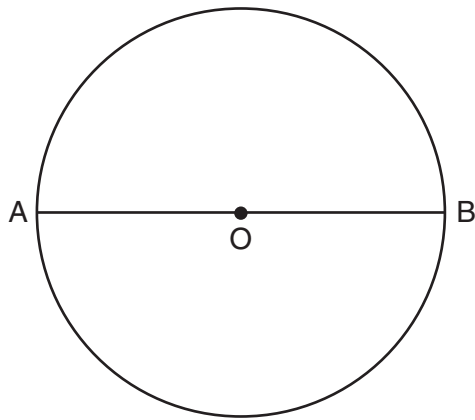


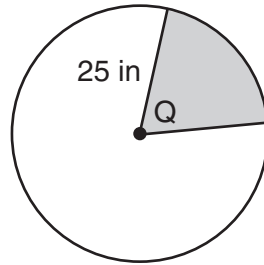
**26** The diagram below shows circle  $O$  with diameter  $\overline{AB}$ . Using a compass and straightedge, construct a square that is inscribed in circle  $O$ . [Leave all construction marks.]



**27** Given: Right triangle  $ABC$  with right angle at  $C$

If  $\sin A$  increases, does  $\cos B$  increase or decrease? Explain why.

28 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is  $500\pi$  in<sup>2</sup>.

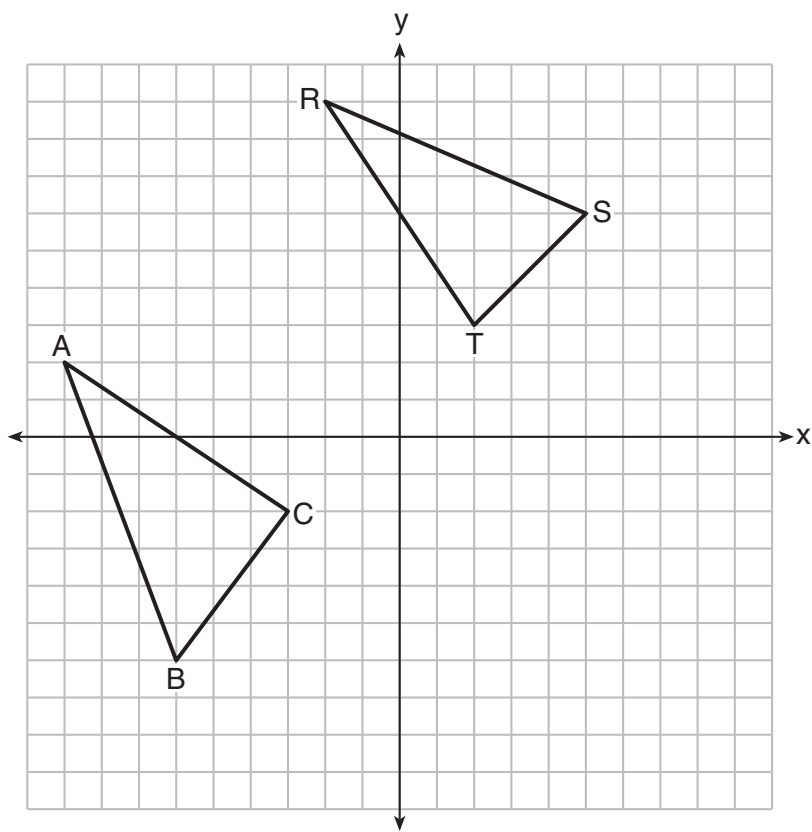


Determine and state the degree measure of angle  $Q$ , the central angle of the shaded sector.

**29** A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for \$0.29 per kilogram, and has a density of  $7.95 \text{ g/cm}^3$ .

If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

30 In the graph below,  $\triangle ABC$  has coordinates  $A(-9,2)$ ,  $B(-6,-6)$ , and  $C(-3,-2)$ , and  $\triangle RST$  has coordinates  $R(-2,9)$ ,  $S(5,6)$ , and  $T(2,3)$ .



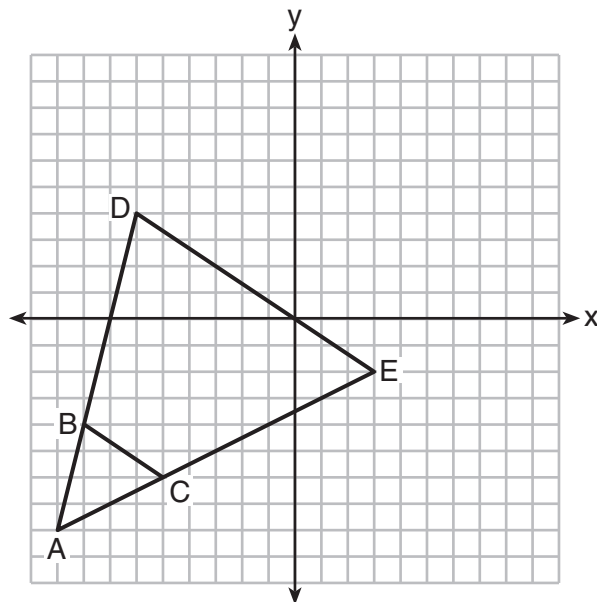
Is  $\triangle ABC$  congruent to  $\triangle RST$ ? Use the properties of rigid motions to explain your reasoning.

**31** Bob places an 18-foot ladder 6 feet from the base of his house and leans it up against the side of his house. Find, to the *nearest degree*, the measure of the angle the bottom of the ladder makes with the ground.

### Part III

Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

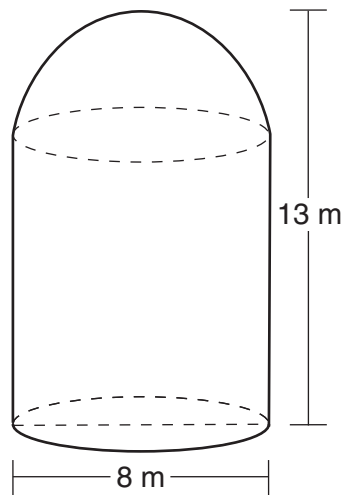
32 Triangle  $ABC$  and triangle  $ADE$  are graphed on the set of axes below.



Describe a transformation that maps triangle  $ABC$  onto triangle  $ADE$ .

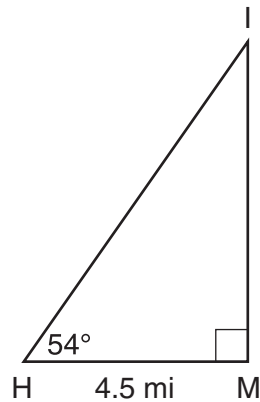
Explain why this transformation makes triangle  $ADE$  similar to triangle  $ABC$ .

**33** A storage tank is in the shape of a cylinder with a hemisphere on the top. The highest point on the inside of the storage tank is 13 meters above the floor of the storage tank, and the diameter inside the cylinder is 8 meters. Determine and state, to the *nearest cubic meter*, the total volume inside the storage tank.





34 As shown in the diagram below, an island ( $I$ ) is due north of a marina ( $M$ ). A boat house ( $H$ ) is 4.5 miles due west of the marina. From the boat house, the island is located at an angle of  $54^\circ$  from the marina.



Determine and state, to the *nearest tenth of a mile*, the distance from the boat house ( $H$ ) to the island ( $I$ ).

Determine and state, to the *nearest tenth of a mile*, the distance from the island ( $I$ ) to the marina ( $M$ ).

**Part IV**

**Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]**

**35** In the coordinate plane, the vertices of triangle  $PAT$  are  $P(-1, -6)$ ,  $A(-4, 5)$ , and  $T(5, -2)$ . Prove that  $\triangle PAT$  is an isosceles triangle. [The use of the set of axes on the next page is optional.]

State the coordinates of  $R$  so that quadrilateral  $PART$  is a parallelogram.

**Question 35 is continued on the next page.**

**Question 35 continued**

Prove that quadrilateral  $PART$  is a parallelogram.

