

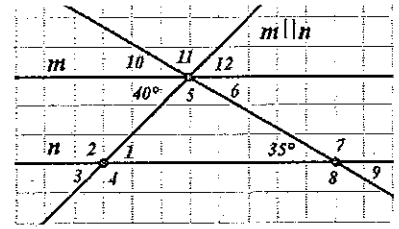
Do NOT use decimal approximation for  $\pi$ ,  $\sqrt{2}$ ,  $\sqrt{3}$  etc. Radicals should be expressed in simplest radical form, and fractions should be expressed in lowest terms. Label answers with unit measurements where appropriate.

$\angle 4 =$  \_\_\_\_\_ 1. Find the measure of the following angles:  $\angle 4$ ,  $\angle 5$ ,  $\angle 6$ ,  $\angle 11$ .

$\angle 5 =$  \_\_\_\_\_

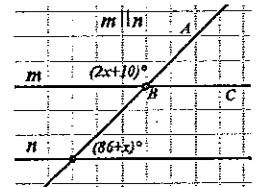
$\angle 6 =$  \_\_\_\_\_

$\angle 11 =$  \_\_\_\_\_



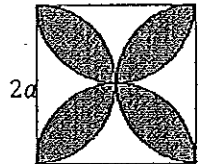
\_\_\_\_\_ 2. The perimeter of one triangle is  $\frac{11}{13}$  of the perimeter of a similar one. The difference in the lengths of the two corresponding sides is 1 m. Find the length of these corresponding sides.

$\angle ABC =$  \_\_\_\_\_ 3. How many degrees in  $\angle ABC$ ?



\_\_\_\_\_ 4. A cube's base diagonal equals  $a$ . Find the distance  $d$  in terms of  $a$  between opposite faces of the cube.

$A =$  \_\_\_\_\_ 5. Given a square. The shaded region is the common area to four semicircles whose diameters are the sides length  $2a$ . Find the area of the shaded region in terms of  $a$ .

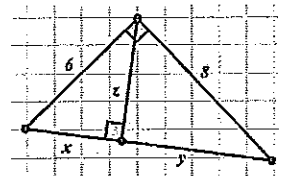


\_\_\_\_\_ 6. Imagine a board similar to a chessboard. Each cell around the edge of the board and one of the diagonals contains a chess piece. Sixty-four chess pieces are used. How many empty cells are left on the board?

$x =$  \_\_\_\_\_ 7. In a given triangle, find the lengths  $x$ ,  $y$  and  $z$ .

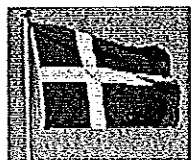
$y =$  \_\_\_\_\_

$z =$  \_\_\_\_\_



$h =$  \_\_\_\_\_ 8. The lateral surface area of a regular rectangular prism is  $32 \text{ ft}^2$  and the surface area is  $40 \text{ ft}^2$ . Find the height of the prism.

\_\_\_\_\_ 9. A Danish flag is designed with a white cross on a red background. One of the requirements of the flag is that the area of white cross is half the area of the entire flag. What is the width of the white cross if the length of the flag is 7.5 feet and the width of the flag is 5 feet? Round to the nearest hundredth.



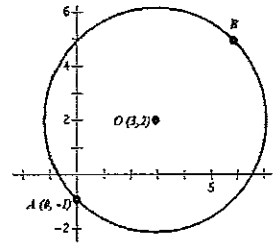
10. The area of a rhombus is  $12 \text{ in}^2$ . If the length of diagonals of this rhombus has a proportion of 2 to 3, find the length of these diagonals.

11. Liquid was poured out from a right conic circular container with the height  $0.18 \text{ m}$  and the diameter of the base being  $0.24 \text{ m}$  into a right cylindrical circular container with the diameter of the base being  $0.1 \text{ m}$ . How high would liquid fill the cylindrical container? *Round to the nearest hundredth.*

12.  $\overline{AB}$  is the diameter of a circle whose center is the point  $O$  with coordinates  $(3,2)$ . The coordinates of  $A$  are  $(0,-1)$ .

*Find:*

- a.  $B =$  \_\_\_\_\_ a. the coordinates of a point  $B$
- b.  $m =$  \_\_\_\_\_ b. the slope  $m$  of the line passing through points  $A$  and  $B$
- c.  $y =$  \_\_\_\_\_ c. the equation of line passing through points  $A$  and  $B$



13. Answer the following:

- a. \_\_\_\_\_ a. A chord divides a circle in two arcs, such that the proportion of the angle measure of these arcs is 3 to 7. If you are in the center of the circle, under what angle can you observe the chord?
- b. \_\_\_\_\_ b. If you are in the center of the Earth, under what angle can you observe  $800 \text{ km}$  of the length of the equator, if the equator length is about  $40,000 \text{ km}$ ? *Round to the nearest tenth.*

14. A solid copper cylinder has a height of  $8 \text{ cm}$ . It has a diameter at the base of  $8 \text{ cm}$ . The cylinder was molded into the form of a ball. Find the diameter of the ball. *Round to the nearest tenth.*

15. A sheet of cardboard has dimensions of  $24 \text{ cm} \times 16 \text{ cm}$ . Squares with the side length of  $4 \text{ cm}$  were cut from each corner of the cardboard. A box was made from the new shape.

*Find:*

- a. \_\_\_\_\_ a. the area of the base of the box
- b. \_\_\_\_\_ b. the total area of the sides of the box
- c. \_\_\_\_\_ c. the volume of the box

