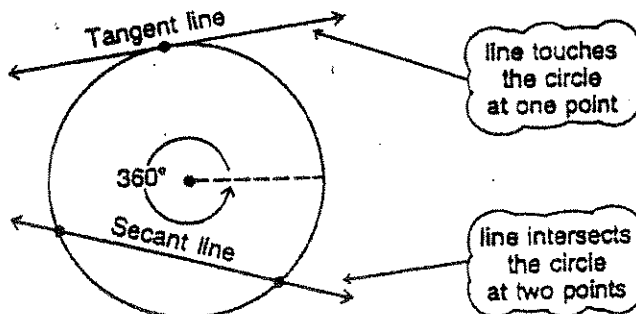
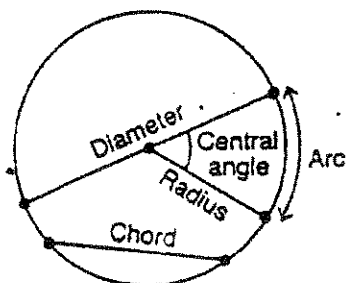


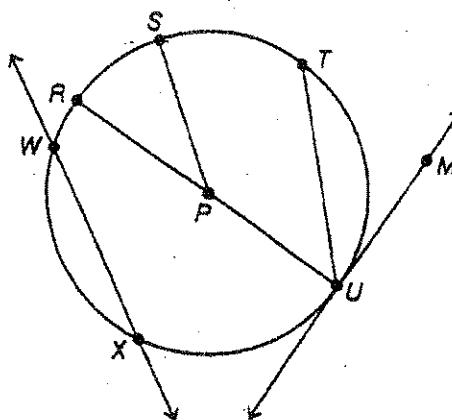
# Circles

A circle is all the points in a plane that are the same distance from one point called the center.



Use the circle *P* for exercises 1–8.  
Write the name for each part of the figure.

1.  $\overline{RU}$      diameter
2.  $\overline{PS}$      \_\_\_\_\_
3.  $\overline{TU}$      \_\_\_\_\_
4.  $\overrightarrow{WX}$     \_\_\_\_\_
5.  $\widehat{RS}$      \_\_\_\_\_
6.  $\angle SPR$     \_\_\_\_\_
7.  $\overrightarrow{UM}$     \_\_\_\_\_
8.  $\overline{WX}$      \_\_\_\_\_



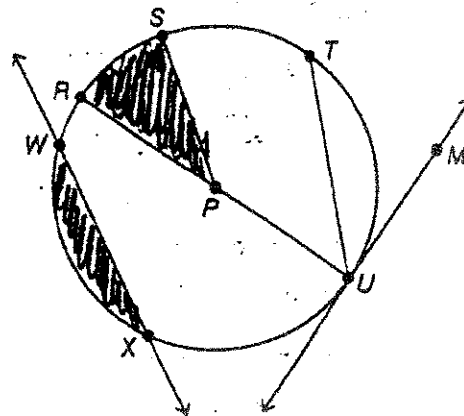
9. *P*     \_\_\_\_\_
10.  $\widehat{RUS}$     \_\_\_\_\_

11. shaded area enclosed by  $\angle RPS$

\_\_\_\_\_

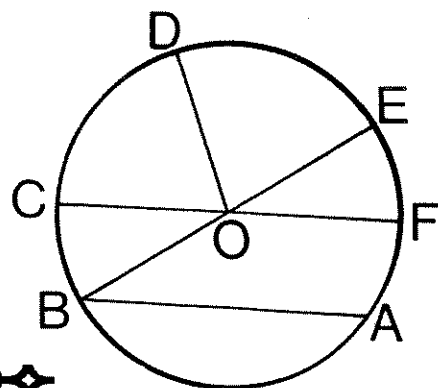
12. shaded area cut off by  $\overline{WX}$

\_\_\_\_\_



# What Can You Wear to a Costume Party?

Complete any statement below with one of the answers given at the bottom of the page. Then write the letter of the statement above its correct answer. Keep working and you will discover the answer to the above question.



- (T) The set of points in a plane at a fixed distance from a given point is a \_\_\_\_\_.
- (I) The points on a circle are all the same distance from the \_\_\_\_\_.
- (S) A line segment from the center to any point on a circle is a \_\_\_\_\_.
- (E) A line segment with both endpoints on a circle, such as  $\overline{AB}$  is a \_\_\_\_\_.
- (U) A chord that passes through the center of a circle is a \_\_\_\_\_.
- (I) The length of a radius is \_\_\_\_\_ the length of a diameter.
- (T) An angle whose vertex is at the center of a circle is a \_\_\_\_\_.
- (E) Part of a circle is an \_\_\_\_\_.
- (I) If  $m \angle DOF$  is  $110^\circ$ , then  $m(\widehat{DF})$  is \_\_\_\_\_.
- (S) If  $m \angle DOF$  is  $110^\circ$ , then  $m(\widehat{FBD})$  is \_\_\_\_\_.
- (H) If  $m \angle BOF$  is  $150^\circ$ , then  $m(\widehat{CE})$  is \_\_\_\_\_.
- (L) If  $m \angle BOF$  is  $150^\circ$ , then  $m(\widehat{EAC})$  is \_\_\_\_\_.
- (I) If  $m \angle BOF$  is  $150^\circ$ , then  $m(\widehat{BC})$  is \_\_\_\_\_.
- (D) If  $m \angle BOF$  is  $150^\circ$ , then  $m(\widehat{CEB})$  is \_\_\_\_\_.
- (M) An arc with a degree measure less than  $180^\circ$  is a \_\_\_\_\_.
- (G) An arc with a degree measure more than  $180^\circ$  is a \_\_\_\_\_.



$330^\circ$	half	$250^\circ$	major arc	diameter	$30^\circ$	radius	arc	circle	$150^\circ$	chord	$210^\circ$	$110^\circ$	minor arc	center	central angle

MATH 106 – CIRCLE ACTIVITY

**1. Using the paper circle, fold the circle in half.**

- a. What is the new shape called? \_\_\_\_\_
- b. What is its straight edge called? \_\_\_\_\_
- c. Define a diameter: \_\_\_\_\_
- d. How much of the area of the circle is in the semicircle? \_\_\_\_\_
- e. How can you find the center of the circle? \_\_\_\_\_

**2. Open the circle. Fold a second semicircle. Mark the point where the diameters intersect. Open the circle.**

- a. What can you say about the two diameters? \_\_\_\_\_
- b. What is the line segment that is one-half the diameter called? \_\_\_\_\_
- c. How many radii (plural for radius) do you see? \_\_\_\_\_
- d. How many sectors do you see? \_\_\_\_\_
- e. How do the size and shape of opposite sectors compare? \_\_\_\_\_
- f. How does the measure of opposite angles compare? \_\_\_\_\_
- g. What shape do any two adjacent sectors form? \_\_\_\_\_
- h. What is the sum of any two adjacent arcs? \_\_\_\_\_
- i. If two adjacent sectors are combined, how does their area compare to the area of the circle? \_\_\_\_\_

**3. Fold a third semicircle**

- a. What can you say about the three diameters? \_\_\_\_\_
- b. How many radii do you see? \_\_\_\_\_
- c. Compare the radii? \_\_\_\_\_
- d. How many sectors do you see? \_\_\_\_\_
- e. What shape do any three adjacent sectors form? \_\_\_\_\_

**4. Open the circle and fold one edge of the circle to the center.**

- a. What is the straight line segment formed by the fold called? \_\_\_\_\_
- b. What is a special name for the arc that remains? \_\_\_\_\_

5. **Make a second fold to the center so that the end of the new chord meets an end of the first chord. Crease both folds. The figure now resembles an ice cream cone.**

- a. What elements of the circle form its boundary? \_\_\_\_\_
- b. What part of the circle is in the intercepted arc? \_\_\_\_\_
- c. What is the measure of the arc? \_\_\_\_\_
- d. What is the angle formed by the two chords called? \_\_\_\_\_
- e. What is the measure of the inscribed angle? \_\_\_\_\_
- f. How does the measure of the angle compare to the measure of the arc? \_\_\_\_\_

6. **Make a third fold to the center, so the ends of the new chord meet the remaining ends of the previous two chords. Crease.**

- a. What is the name of the shape that is formed? \_\_\_\_\_
- b. We say that the equilateral triangle is **inscribed** in the circle, because its vertices touch the edge of the circle. How do the measures of the sides of the equilateral triangle compare? \_\_\_\_\_
- c. How do the angles of the equilateral triangle compare? \_\_\_\_\_
- d. What is the measure of each angle of the equilateral triangle? \_\_\_\_\_
- e. Open up the circle. Is the area of the equilateral triangle more or less than one-half the area of the circle? Why?  
\_\_\_\_\_

7. **Fold back into an equilateral triangle. Find the midpoint of one side. Make a fold passing through this midpoint and the opposite vertex.**

- a. What type of triangle is formed? \_\_\_\_\_
- b. What is the measure of each of its angles? \_\_\_\_\_
- c. The side that is also a side of the equilateral triangle is called the **hypotenuse**, the other two sides are called **legs**. How do the lengths of the sides compare?  
\_\_\_\_\_
- d. What is the measure of the angle opposite the hypotenuse? \_\_\_\_\_
- e. What is the measure of the angle opposite the shorter leg? \_\_\_\_\_
- f. What is the measure of the angle opposite the longer leg? \_\_\_\_\_
- g. How does the area of the right triangle compare to the area of the equilateral triangle? \_\_\_\_\_

MATH 106  
COMPASS & STRAIGHT EDGE CONSTRUCTION

Types of constructions:

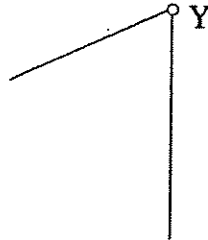
1. Copy an angle
2. Bisect an angle
3. Create a perpendicular line thru a point
4. Bisect a line
5. Create a parallel line thru a point

You **may not** use a ruler to measure anything, just your compass. Every radius of the same circle has the same length. This is the basis of all constructions.

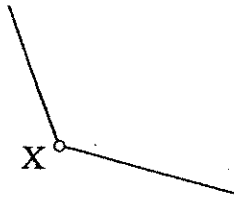
## COMPASS AND STRAIGHTEDGE WORKSHEET

Using only a compass and straightedge construct the following shapes. No measurements can be made except those made with the compass.

1. Bisect angle  $y$ :



2. Construct an angle  $\frac{3}{4}$  the size of angle  $x$ :

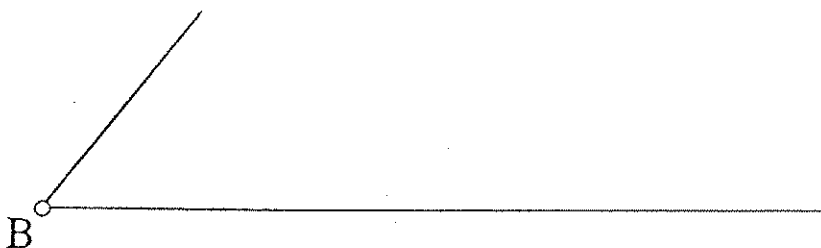


3. Construct a line segment that is  $\frac{1}{4}$  of the length of line segment  $AB$ :

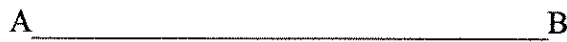


4. Construct an angle of  $45^\circ$  and one of  $135^\circ$

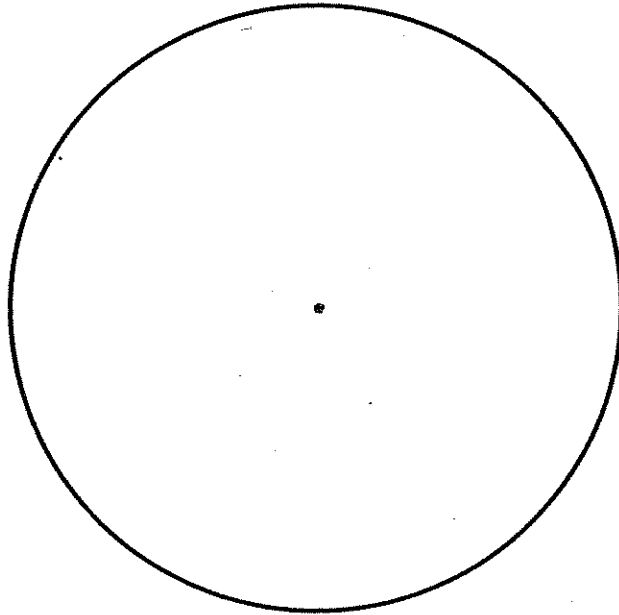
5. Copy angle B along the line shown (horizontal line). Draw in the parallel line that is horizontal.



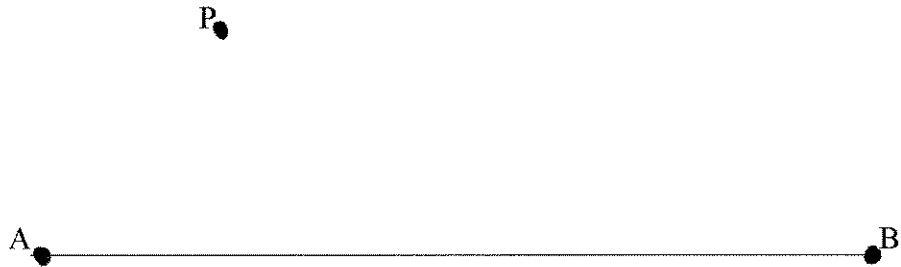
6. Using segment AB, set the compass at the length of AB and draw circles with their centers at A and B. The circles will intersect at a point above AB, call it C. If you draw in the segments AC and BC, what shape have you formed?



7. The diagonals of a square are perpendicular bisectors of each other. Use this information to construct a square inscribed in this circle

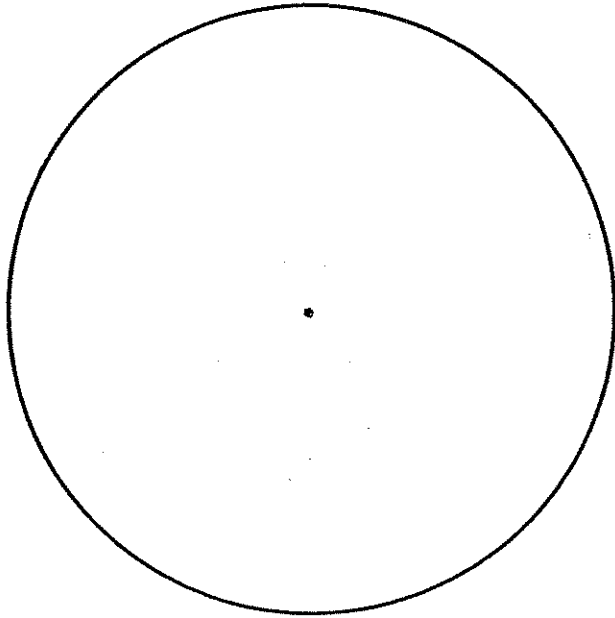


8. Construct a line perpendicular to AB, that goes thru point P.

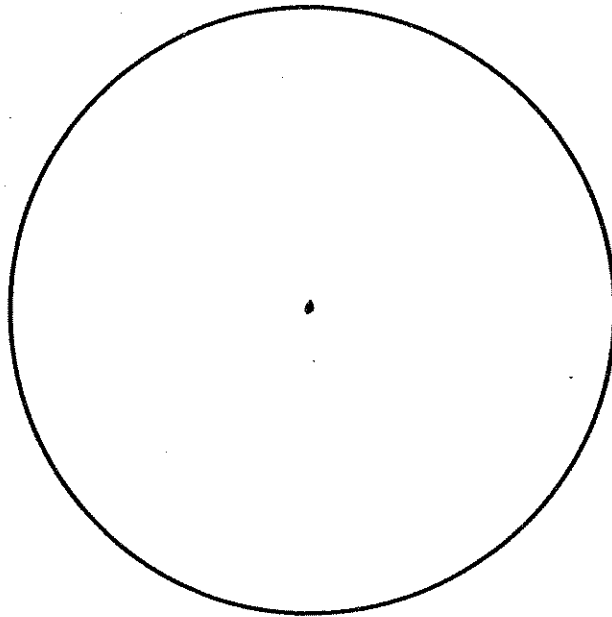


9. Construct a  $60^\circ$  angle by constructing an equilateral triangle. Bisect an angle to form a  $15^\circ$  angle. Create a  $45^\circ$  angle (or copy the one from problem 4). Copy these two angles to form a  $75^\circ$  angle.

10. Using the information in problem #7, construct a regular octagon in the circle shown.



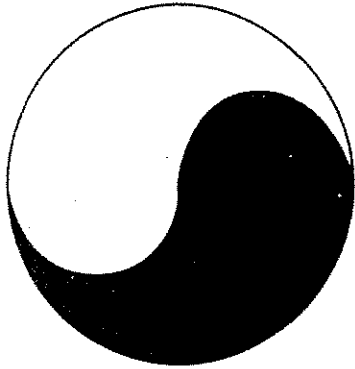
11. Using the information in problem #5, construct a regular hexagon in the circle shown.



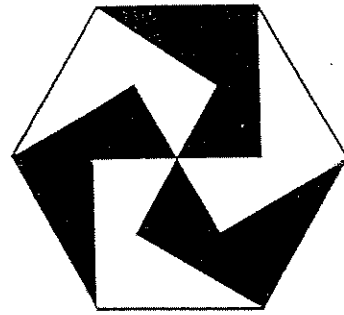
## Constructible Designs

The following designs can be constructed using only compass and straightedge. How many of these designs can you construct? Hint: It may be easier to construct versions larger than those shown.

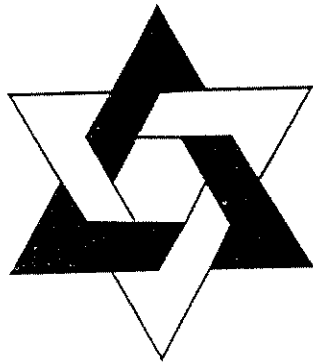
A.



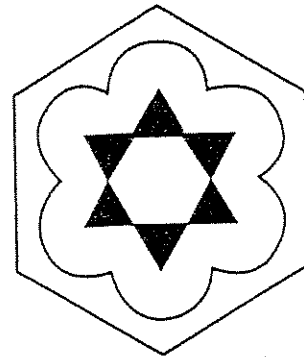
B.



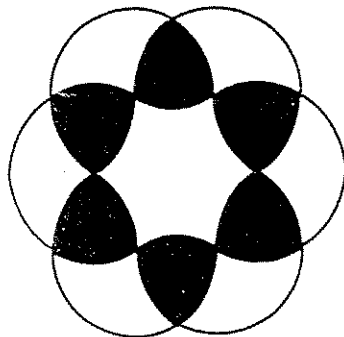
C.



D.



E.



F.

