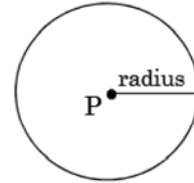
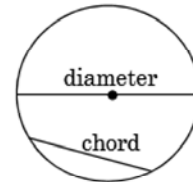


A circle is a set of points that are equidistant from a fixed point in a plane.

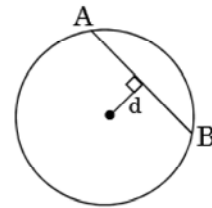
Circles are named for their centers, so this circle would be named circle P. The radius is the distance from the center to a point on the circle, as shown. All radii of a circle are equal.



A chord of a circle is a segment joining any two points of the circle. A chord that passes through the center is called a diameter. See diagram at right.

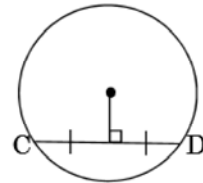


The distance from the center of a circle to a chord is the measure of the perpendicular segment from the center to the chord. At right, d is the distance from the center to chord AB.



If a radius is perpendicular to a chord, then it bisects the chord.

If a radius of a circle bisects a chord that is not a diameter, then it is perpendicular to that chord.

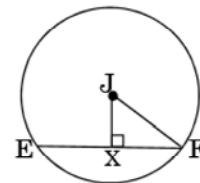


Also, the perpendicular bisector of a chord passes through the center of the circle.

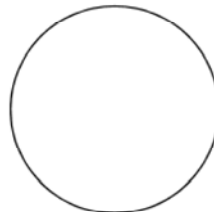
Problems:

1. At right, draw a circle R with radius 2 cm. Draw a chord XY of length 3 cm, a diameter XT, and a radius RP.

2. Given circle J shown at right with diameter 14 in and $EF = 12$ in. Find JX.



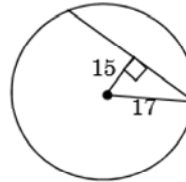
3. Given circle P at right, draw a chord KM. $KM = 20$ cm. The distance of KM to the center is 6 cm. Find the length of the radius.



1. Draw a circle with radius 1 inch. Label the center J.
 - Draw a radius. Label the point of intersection with the circle point Q.
 - Using the length of the radius, make an arc from point Q to the circle. Label it G.
 - Connect points J, Q, and G to form a triangle.
 - a. What is the name of the circle? _____
 - b. How many vertices of the triangle are on the circle? _____
 - c. What are \overline{JQ} and \overline{JG} called? _____
 - d. What is \overline{QG} called? _____
 - e. Angle JQG in degrees = _____
 - f. What kind of triangle must $\triangle JQG$ be? _____
 - g. Why? _____

2. Find the length of a chord that is 15 cm from the center of a circle with radius 17 cm.

(Figure not drawn to scale.)



3. Draw a circle P.
 - Draw a chord and label it \overline{AB} .
 - Draw a ray from the center perpendicular to \overline{AB} .
 - If chord \overline{AB} is 12 mm long and the radius of the circle is 10 mm, find the distance from the chord to the center of the circle.

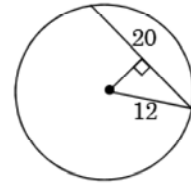
4. If a chord 10" long is 5" from the center of a Circle, find the length of the radius.

Selected scrambled answers: 16, chord, 2, 7.1, radii, 60, 8

Circles-Working with Chords 2

12.03

5. In a circle with radius 12', find the length of a segment joining the midpoint of a chord and the center of the circle.

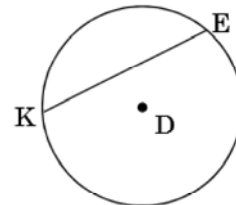


6. Find the radius of a circle in which an inscribed square (all vertices on circle) with side 8 cm is drawn.

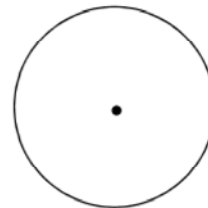
7. Draw a circle with radius 2". Label center E. Draw a chord \overline{AB} . Draw a segment representing the distance from the center to chord \overline{AB} . Label the point on \overline{AB} point X.

- If $AE = 5$ and $EX = 3$, then $AB = \underline{\hspace{2cm}}$
- If $AB = 6$ and $EX = 4$, then $AE = \underline{\hspace{2cm}}$
- If $AB = 2\sqrt{2}$ and $AE = \sqrt{6}$, then $XE = \underline{\hspace{2cm}}$

8. Chord \overline{KE} is 8 mm long. The diameter of circle D is 10 mm. Find the distance from \overline{KE} to D.



9. Find the length of a chord that is 8 cm from the center of a circle with a radius of 17 cm.



Scrambled answers: 3, 5.7, 30, 8, 6.6, 5, 2

If two chords of a circle are equal, then they are equidistant from the center of the circle.

If $FR = IU$, then $ES = SG$.

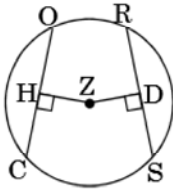


If two chords of a circle are equidistant from the center, then they are equal.

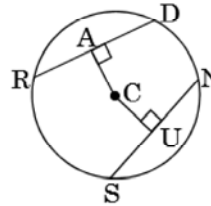
If $ST = TU$, then $ED = QA$.



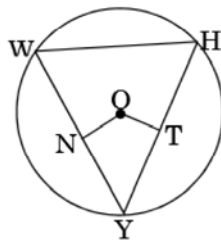
1. Given circle Z and $CO = SR$.
 $HZ = 15x - 4$ and $ZD = 3x + 20$



2. Given circle C with $AC = CU$
 $RD = 7x + 1$ and $SN = 11 - 3x$

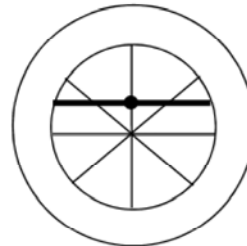


3. Given circle O with $\overline{ON} \perp \overline{WY}$,
 $\overline{OT} \perp \overline{HY}$, and $ON = OT$. What type of triangle is $\triangle WHY$?



4. Stella is sitting on the midpoint of a steel chord of a wheel. The spoke has a length of 10 m and the chord has a length of 16 m.

- a) How far from the hub (center) is Stella?
 b) The wheel is spun. What is Stella's path?



Selected scrambled answers: 6, 2, 8