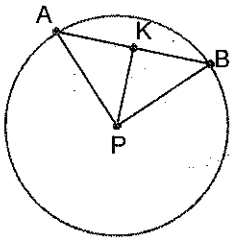


1. Which of the following statements are true?

- a. There is exactly one great circle of a sphere
- b. Every chord of a circle contains two points of the circle.
- c. A radial segment of a circle is a chord of the circle
- d. The center of a circle bisects exactly one chord of the circle.
- e. A secant of a circle can intersect the circle in exactly one point
- f. A chord of a sphere can be longer than a radial segment of the sphere
- g. If a sphere and a circle have the same center and intersect, then the intersection is a great circle of the sphere
- h. Two concentric circles cannot intersect.
- i. If a line in the plane of a circle intersects the circle in one point, the line intersects the circle in two points
- j. The intersection of a line and a circle may be empty.
- k. A line that is in the plane of a circle and contains the center of the circle intersects the circle in two points
- l. If a plane intersects a sphere in at least two points, then the intersection is a line
- m. A plane cannot intersect a sphere in exactly one point.

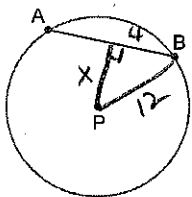
2. If \overline{PA} and \overline{PB} are radial segments and \overline{KP} is the perpendicular bisector of \overline{AB} , prove that \overline{PK} bisects $\angle APB$.



- ① \overline{PA} + \overline{PB} are radii
- ② $\overline{KP} \perp$ bisector \overline{AB}
- ③ $PA = PB$
- ④ $KP = KP$
- ⑤ $AK = KB$
- ⑥ $\triangle AKP \cong \triangle BKP$
- ⑦ $\angle APK \cong \angle BKP$
- ⑧ \overline{PK} bisects $\angle APB$

- ① Given
- ② radii of same $\odot =$
- ③ reflexive
- ④ Bisector \div seg into 2 = parts
- ⑤ SSS
- ⑥ If \triangle 's \cong , corresponding \angle 's =
- ⑦ Bisector \div \angle into 2 = parts

3. Find the distance from the center of a circle to its chord \overline{AB} , if $AB = 8$ cm and the radius of the circle is 12 cm.



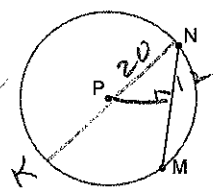
$$x = \sqrt{12^2 - 4^2}$$

$$x = \sqrt{128} \text{ cm}$$

$$8\sqrt{2} \text{ cm}$$

$$\approx 11.31$$

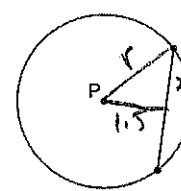
4. Given this circle. Diameter $\overline{KN} = 40$ cm and chord $\overline{MN} = 24$ cm. Find the distance from the center of the circle to \overline{MN} .



$$x = \sqrt{20^2 - 12^2}$$

$$x = 16 \text{ cm}$$

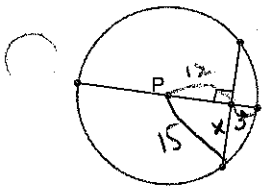
5. If a chord 4 cm long is 1.5 cm from the center of a circle, find the radius of the circle



$$r = \sqrt{2^2 + 1.5^2}$$

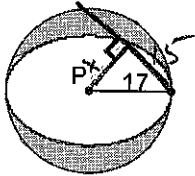
$$r = 2.5 \text{ cm}$$

6. In a circle of diameter 30 cm, a chord is drawn perpendicular to a radial segment. The distance from the intersection of the chord and the radial segment to the outer endpoint of the radial segment is 3 cm. Find the length of the chord.



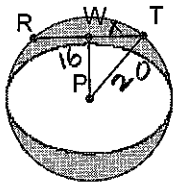
$$\begin{aligned} \text{chord} &= 2x \\ x &= \sqrt{15^2 - 12^2} \\ x &= 9 \\ \text{chord} &= 18 \text{ cm} \end{aligned}$$

7. A perpendicular segment from the center of a sphere of radius 17 cm and center P is drawn to a chord of length 30 cm. Find the length of the perpendicular segment.



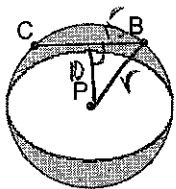
$$\begin{aligned} x &= \sqrt{17^2 - 15^2} \\ x &= 8 \text{ cm} \end{aligned}$$

8. If \overline{PT} is a radial segment of a sphere with radius 20 cm and center P, $PW = 16$ cm, and $\overline{PW} \perp \overline{TR}$, find TR.



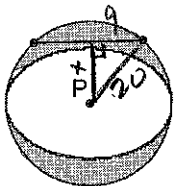
$$\begin{aligned} \text{chord} &= 2x \\ x &= \sqrt{20^2 - 16^2} \\ x &= 12 \\ \text{TR} &= 24 \text{ cm} \end{aligned}$$

9. Chord \overline{CB} of this sphere with center P has a length of 30 cm and is at a distance of 10 cm from the center of the sphere. Find the radius and diameter of the sphere.



$$\begin{aligned} r &= \sqrt{10^2 + 15^2} \\ r &= \sqrt{325} \text{ cm} \approx 18.03 \\ \text{diameter} &= 2\sqrt{325} \text{ cm} \approx 36.06 \\ &= 10\sqrt{13} \text{ cm} \end{aligned}$$

10. The diameter of a sphere is 40 cm. How far from the center, point P, of the sphere is a chord that has length 18 cm?



$$\begin{aligned} x &= \sqrt{20^2 - 9^2} \\ x &= \sqrt{319} \text{ cm} \\ &= 17.8606 \end{aligned}$$

11. If A is a point on the sphere, how many great circles go through point A? 1 or ∞

How many small circles? ∞

12. If A and B are two random points on the sphere, how many great circles contain both of them? none or 1 or ∞ How many small circles? 1 or ∞ or none

13. If A, B, and C are three random points on the sphere, how many great circles contain all three of them? 1 or none How many small circles? 1 or none