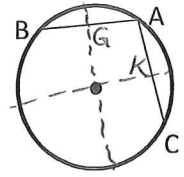


TASK 1: CHORDS OF A CIRCLE



1. Using your compass, carefully construct a large circle on your patty paper.
 2. Darken the center of your circle. Label it with Point P.
 3. Draw a point *on* your circle and label it with Point A.
 4. **Construct chord \overline{AB} .** Construct chord \overline{AB} such that it does not intersect the center Point P.
 5. **Construct a chord that is congruent to chord \overline{AB} .** Use your compass to record the distance between points A and B. Using this distance, with the compass point on Point A, draw an arc that intersects the other side of the circle. Label that point of intersection with Point C. Construct \overline{AC} using your protractor.
- STOP and compare your circle with others' before continuing.**
6. Fold your patty paper so that the endpoints A and B touch.
 7. Using your protractor as a straight edge, draw a segment along the crease with the endpoints on the circle. Label the endpoints with Point E and Point F. Label the point where this segment intersects chord \overline{AB} with Point G.

QUESTIONS:

- A. Is there something unique about the segment you drew in step #7 with regards to Circle P? Explain.
It is the diameter of Circle P. Crosses center
- B. What observation(s) can you make about \overline{AG} and \overline{BG} ? they are \cong .
- C. There were four angles formed at Point G where the chords intersect. What is true about them?
They are Right Δ 's
- D. We can say that chord \overline{EF} is a perpendicular bisector of chord \overline{AB} .

8. Fold your patty paper so that the endpoints A and C touch.
9. Using your protractor as a straight edge, draw a segment along the crease with the endpoints on the circle. Label the endpoints with Point H and Point J. Label the point where this segment intersects chord AC with Point K.
10. Would your answers to Questions A – D above follow suit for this particular chord AC? _____

Perpendicular Bisector of a Chord Conjecture

The perpendicular bisector of any chord passes through the Center of the circle.

Perpendicular to a Chord Conjecture

The perpendicular from the Center of a circle to a chord is the bisector of the chord.

TASK 2: COMPARING DISTANCES

Recall that $\overline{AB} \cong \overline{AC}$. Using the same patty paper from Task 1, carefully fold it such that \overline{PG} and \overline{PK} meet. What is true about \overline{PG} and \overline{PK} ? they are \cong

Chord Distance to Center Conjecture

Two Congruent chords in a circle are equidistant from the center of the circle.

Use the figure to the right the answer #1-5:

1. Name the diameter DE

2. Name four right angles

$\angle ACD, \angle DCB, \angle BCF, \angle FCA$

3. $\overline{AB} \cong \overline{GH}$

4. $\overline{FC} \cong \overline{FJ}$

5. Find the length of \overline{FC}

$$x^2 + 3^2 = 5^2$$

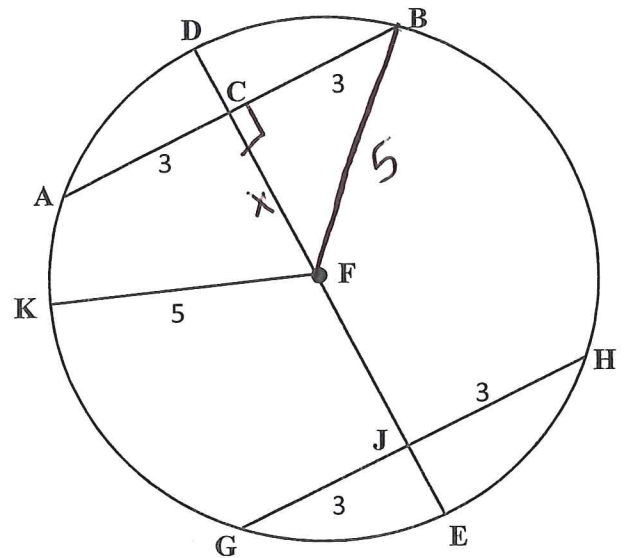
$$x^2 + 9 = 25$$

$$-9 \quad -9$$

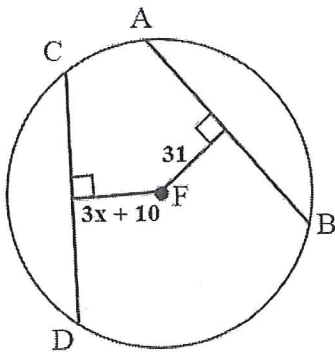
$$\sqrt{x^2} = \sqrt{16}$$

$$x = 4$$

$$\boxed{FC = 4}$$



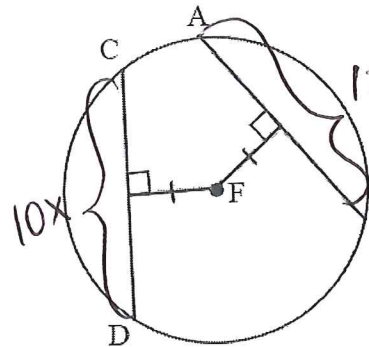
6. Given $\overline{AB} \cong \overline{CD}$, find x.



$$3x + 10 = 31$$

$$-10 \quad -10$$

$$\frac{3x}{3} = \frac{21}{3}$$



$$12x - 18$$

$$12x - 18 = 10x$$

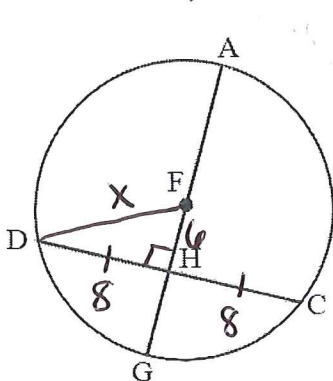
$$-12x \quad -12x$$

$$\frac{-18}{-2} = \frac{-2x}{-2}$$

$$x = \underline{7}$$

$$x = \underline{9}$$

8. Given \overline{AG} bisects \overline{DC} ; $FH = 6$; and $DC = 16$, find FG and AG .



$$6^2 + 8^2 = (FD)^2$$

$$36 + 64 = (FD)^2$$

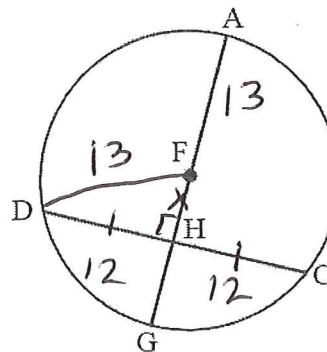
$$\sqrt{100} = \sqrt{(FD)^2}$$

radius $FD = 10$
 $FG = 10$

$$FG = \underline{10}$$

$$AG = \underline{20}$$

9. Given $\overline{AG} \perp \overline{DC}$; $AG = 26$; and $DC = 24$, find FH .



diameter is 26

$$x^2 + 12^2 = 13^2$$

$$x^2 + 144 = 169$$

$$-144 \quad -144$$

$$\sqrt{x^2} = \sqrt{25}$$

$$x = \underline{5}$$

$$FH = \underline{5}$$