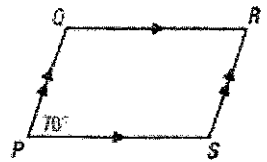


1) Given PQRS is a parallelogram, find the measure of angle  $\angle PSR$ . Explain how you know.

$m\angle PSR = 110$ , same-side interior angles are supplementary when lines are parallel



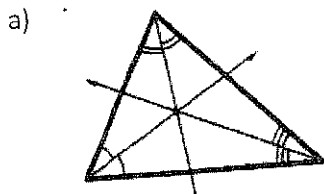
If a quadrilateral is a parallelogram, then	Correct?
Each diagonal divides the parallelogram into two congruent triangles	<input checked="" type="radio"/> T or F
Opposite angles are congruent	<input checked="" type="radio"/> T or F
Consecutive angles are supplementary	<input checked="" type="radio"/> T or F
The diagonals are congruent	T or <input checked="" type="radio"/> F
The diagonals bisect each other	<input checked="" type="radio"/> T or F
The diagonals are perpendicular	T or <input checked="" type="radio"/> F

3) Use the word bank to fill in the following blanks. You will not use all of the words and you may use words more than once.

**Word Bank:**

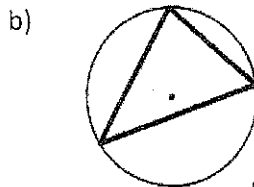
Incenter	Circumcenter	Centroid	Vertex
Side	Gravity	Medians	Perpendicular Bisectors
Circumscribed	Inscribed	Angle Bisectors	Triangle

- a) The angle bisectors of a triangle intersect at the incenter. This point is equidistant to each sides of the triangle, and is the center of a(n) inscribed circle.
- b) Perpendicular bisectors meet at the circumcenter. This point is equidistant to each vertices of the triangle, and is the center of a circumscribed circle.
- c) The point of concurrency for the medians of a triangle is called the centroid. It is the center of gravity for a triangle. It divides the medians into two segments whose lengths are in a ratio of 2:1.
- 4) Name the type of center of the triangle shown in the diagrams below. Explain how you know.



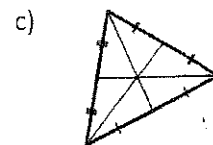
Name: incenter

Explanation: made by angle bisectors



Name: Circumcenter

Explanation: Center of circumscribed circle



Name: centroid

Explanation: made by medians

- 5) Point T is the incenter of  $\triangle PQR$ .  
If  $UR = 2y$ , find  $y$ . Show your work or explain your reasoning.

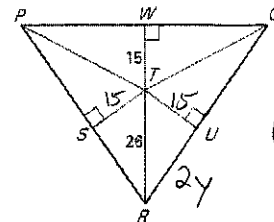
$$15^2 + 2y^2 = 26^2$$

$$225 + 4y^2 = 676$$

$$4y^2 = 451$$

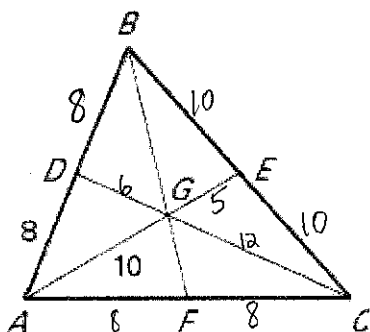
$$y^2 = 112.75$$

$$y = 10.62$$



- 6) Point G is the centroid of  $\triangle ABC$ .

If  $AD=8$ ,  $AG=10$ ,  $BE=10$ ,  $CD=18$  and  $AC=16$ , find the length of each segment. Show your work or explain your reasoning.



$$DB = 8$$

$$CG = 12$$

$$GE = 5$$

$$BC = 20$$

$$EA = 15$$

$$BA = 16$$

$$GD = 6$$

$$AF = 8$$

- 7) Point G is the circumcenter of  $\triangle ABC$ .

If  $GE = 2x - 15$ , find  $x$ . Show your work or explain your reasoning.

$$15^2 + (2x-15)^2 = 25^2$$

$$225 + 4x^2 - 60x + 225 = 625$$

$$4x^2 - 60x + 450 = 625$$

$$4x^2 - 60x - 175 = 0$$

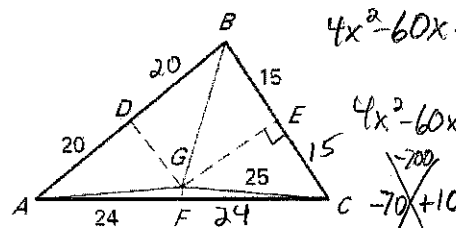
$$-700 \quad -60$$

$$-70 \quad +10$$

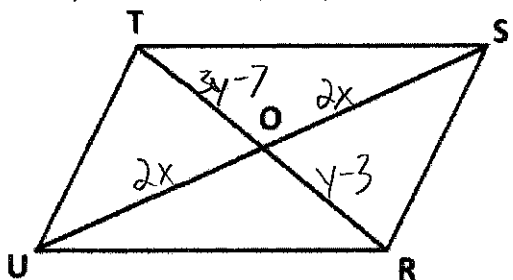
$$(4x^2 - 70x) + (10x - 175) = 0$$

$$4x(x - 17.5) + 10(x - 17.5) = 0$$

$$(4x + 10)(x - 17.5) = 0$$

$$x = 17.5$$


- 8) RSTU is a parallelogram.  $RO = y + 3$ ;  $SU = 4x$ ;  $TO = 3y - 7$ ;  $UO = x + 5$ . Find  $x$  and  $y$ . Show your work or explain your reasoning.



$$3y - 7 = y - 3$$

$$2y = 4$$

$$y = 2$$

$$2x = x + 5$$

$$x = 5$$

- 9) Write the formula for each:

a) Area of a circle =  $\pi r^2$       b) Circumference of a Circle =  $2\pi r$

- 10)

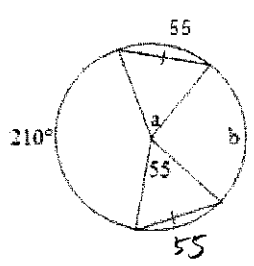
a) Ratio for finding Sector Area:  $\frac{\text{sector area}}{\text{area of a circle}}$

b) Ratio for finding Length of an Arc:  $\frac{\text{arc length}}{\text{circumference}}$

c) Ratio for a Central Angle in Degrees:  $\frac{\text{central angle}}{360}$

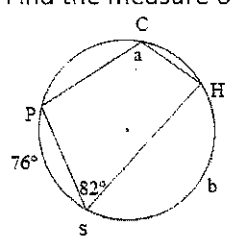
d) Ratio for a Central Angle in Radians:  $\frac{\text{central angle}}{2\pi}$

11) a) Find the measure of angle a and arc b.



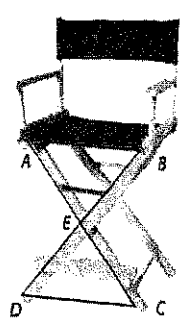
$a = 55$   
 $b = 40$

b) Find the measure of angle a and arc b.



$a = 98$   
 $b = 120$

12) When assembling a chair like that shown here, the legs of the chair,  $\overline{DB}$  and  $\overline{AC}$ , are connected at their midpoints. (E is the midpoint of  $\overline{AC}$  and  $\overline{DB}$ .) Prove that  $\triangle ABE \cong \triangle CDE$ .



Statements	Reasons
1. E is midpoint of $\overline{AC}$ and $\overline{DB}$	1. Given
2. $AE = CE, BE = DE$	2. Def of midpoint
3. $\overline{AE} \cong \overline{CE}, \overline{BE} \cong \overline{DE}$	3. Def of congruence
4. $\angle AEB \cong \angle CED$	4. Vertical Angle Thm
5. $\triangle ABE \cong \triangle CDE$	5. SAS

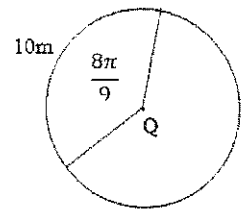
13) a) Find the radius.

$$\frac{10}{2\pi r} = \frac{8\pi}{2\pi r}$$

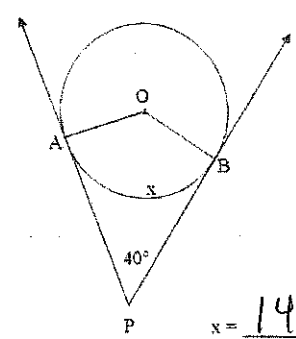
$$9 \cdot 20 = \frac{16\pi}{9} r \cdot 9$$

$$\frac{180}{16\pi} = \frac{16\pi r}{16\pi}$$

$r = 3.58 \text{ m}$

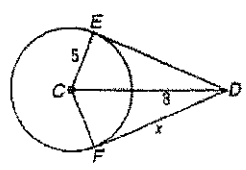


b)  $\overline{PA}$  and  $\overline{PB}$  are tangents to circle O. Find the measure of the intercepted arc indicated by x.



$x = 140$

d)  $m\angle RST = 95$  and  $m\widehat{STU} = 220$ . Find  
 $m\angle SRT = \underline{110}$   
 $m\angle RUT = \underline{85}$   
 $m\widehat{TUR} = \underline{190}$   
 $m\widehat{UTS} = \underline{170}$

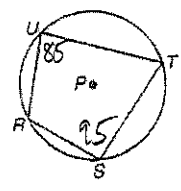


$$x^2 + 5^2 = 8^2$$

$$x^2 + 25 = 64$$

$$\sqrt{x^2} = \sqrt{39}$$

$x = 6.24$

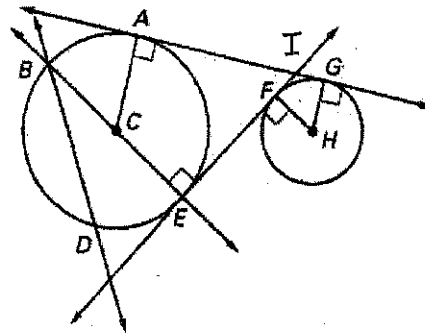


14) Use the word bank to name the term that best describes the notation below.

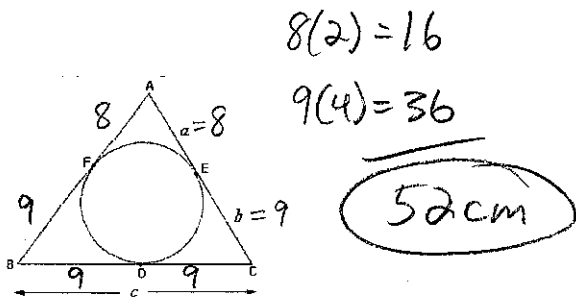
1.  $\overline{AB}$  minor arc
2.  $\angle AIE$  circumscribed angle
3.  $\angle ACE$  central angle
4.  $\overline{HG}$  radius
5.  $\overline{BE}$  diameter
6.  $\overline{BDA}$  major arc
7.  $\overline{BD}$  chord
8.  $\angle DBE$  inscribed angle
9.  $\overline{AG}$  tangent line

Word Bank:

Radius	Central Angle	Major Arc
Minor Arc	Tangent Line	Diameter
Inscribed Angle	Circumscribed Angle	Chord

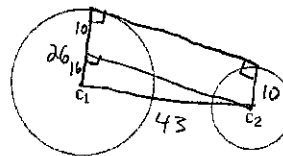


15) Triangle ABC is circumscribed about the circle. Find the perimeter of triangle ABC if  $a = 8$  cm,  $b = 9$  cm, and  $c = 18$  cm.



16)

The radius of Circle  $C_1 = 26$  in and the radius of circle  $C_2 = 10$  in. The distance between the centers of the two circles is 43 in. What is the horizontal length between the two points of tangency?



$$16^2 + x^2 = 43^2$$

$$256 + x^2 = 1849$$

$$\sqrt{x^2} = \sqrt{1593}$$

$$x = 39.9 \text{ in}$$

17) a)



$$\text{Area} = \frac{196\pi}{9}$$

b)

$$\frac{x}{196\pi} = \frac{40}{360}$$

$$\frac{360x}{360} = \frac{7840\pi}{360}$$

$$x = \frac{196\pi}{9}$$

Length of the arc DE = 18.32 cm



$$\text{Area} = 257\pi$$

$$\frac{18.32}{2\pi r} = \frac{210}{360}$$

$$\frac{6595.2}{420\pi} = \frac{420\pi r}{420\pi}$$

$$r = 5$$

c)

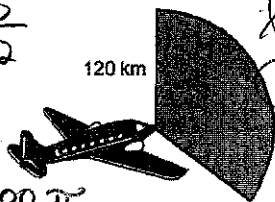
The radar beam sent out by an aeroplane reaches a distance of 12 kilometres and covers an angle of  $150^\circ$ .

$$\frac{150}{360} = \frac{5}{12}$$

$$\frac{5}{12} = \frac{x}{14,400\pi}$$

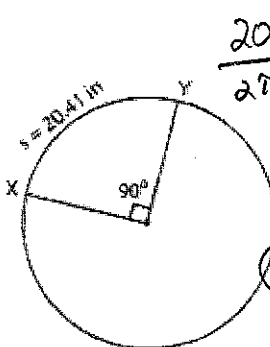
$$12x = 72,000\pi$$

Calculate the area covered by the beam.



$$x = 6000\pi \approx 18,850$$

18) a) Find the radius

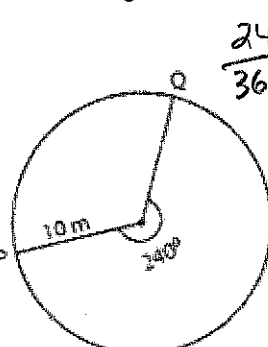


$$\frac{20.41}{2\pi r} = \frac{1}{4}$$

$$\frac{81.64}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 13 \text{ in}$$

b) Find the length of the major arc.



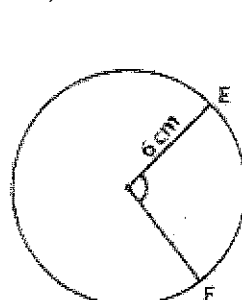
$$\frac{240}{360} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{x}{20\pi}$$

$$\frac{40\pi}{3} = \frac{3x}{3}$$

$$x = \frac{40\pi}{3}$$

c) Find the central angle in radians.



$$\frac{x}{2\pi} = \frac{10.47}{12\pi}$$

$$\frac{12\pi x}{12\pi} = \frac{20.94\pi}{12\pi}$$

$$x = 1.745$$