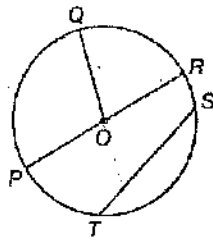


Part 1: Selected Response (1 point each)

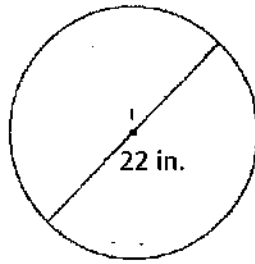
1. Name the various parts of circle O using correct terminology and notation.

also arcs,
central angles,
etc.



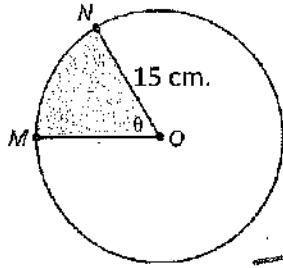
radii = \overline{OP} , \overline{OR} , \overline{OQ}
center O
diameter \overline{PR}
chords: \overline{PQ} , \overline{ST}
arcs: \overline{PQ} , \overline{QR} , \overline{RS} , \overline{ST} , etc.

2. What is the area of the circle shown below?



πr^2
 $\pi(11)^2$
 $121\pi \text{ in}^2$
 $\approx 380.13 \text{ in}^2$

3. In circle O, $m\angle\theta = \frac{\pi}{3}$ and $\overline{OM} = 15$ centimeters.



$\frac{\pi}{3} \cdot \frac{180}{\pi} = 60^\circ$

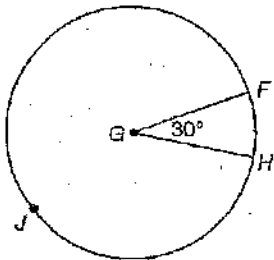
$\frac{\pi}{3} \cdot 2\pi(15)$

What is the exact length of \widehat{MN} ?

$5\pi \text{ cm}$

4. Jane drew several circles, with different radii, using a compass. What must be true of the circles she drew? Similar

5. Circle G is shown.

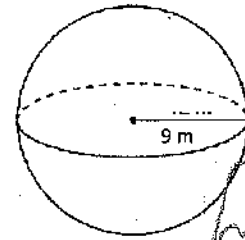


What is the measure of \widehat{FJH} ?

330° or $\frac{11\pi}{6}$

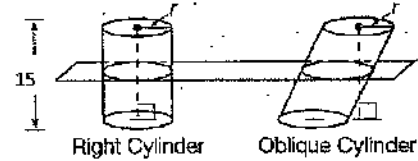
$330 \cdot \frac{\pi}{180}$

6. The sphere shown has a radius of 9 meters. What is the volume of the sphere?



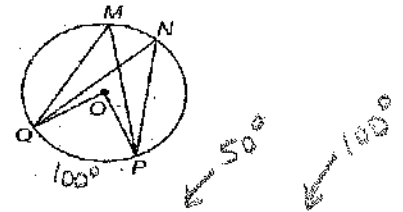
$V = \frac{4}{3}\pi r^3$
 $V = \frac{4}{3}\pi(9)^3$
 $972\pi \text{ m}^3$
 $\approx 3,053.63 \text{ m}^3$

7. Two cylinders are shown below. Each has a height of 15 units and a radius of r units, and each has been cut by a horizontal plane that is parallel to the bases of both cylinders.



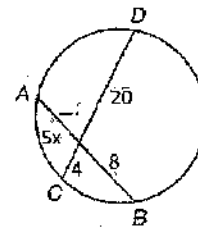
How do the volumes of these two cylinders compare? Same

8. In circle O, $\angle QMP$ measures 50° .



What are the measures of $\angle QNP$ and $\angle QOP$?

9. The circle shows intersecting chords.



What length is represented by x ?

$5x \cdot 8 = 4 \cdot 20$

$40x = 80$

$x = 2$

10. Figure A shows a square inscribed in a circle. Figure B shows a decagon (10-sided figure) inscribed in a circle.

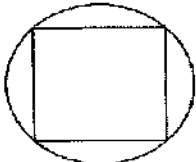


Figure A

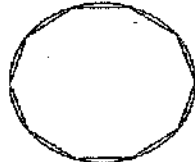
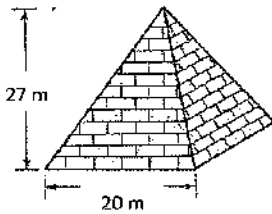


Figure B

Aviva wants to use a polygon inscribed in a circle to approximate the area of the circle. Which polygon has an area that most closely approximates the area of the circle in which it is inscribed? Why? Is there a shape that would approximate the area of the circle more closely than Figure A or B? What is it? Why?

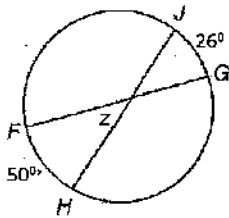
11. The Pyramid of Cestius is an ancient pyramid in Rome, Italy. It has a height of 27 meters and a square base with sides measuring 20 meters.



$$V = \frac{1}{3} (20 \cdot 20) (27)$$

What is the volume of the pyramid? 3600 m^3

12. In the circle, \overline{FG} and \overline{HJ} are intersecting chords.

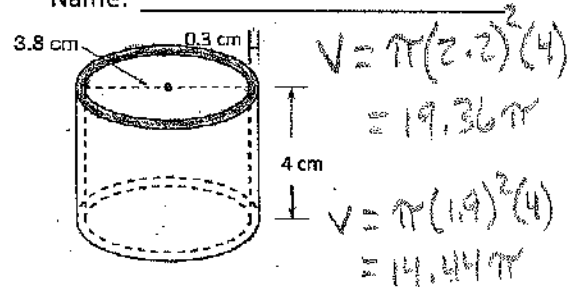


$$z = \frac{1}{2} (50 + 26)$$

$$z = 38^\circ$$

What is the value of z ?

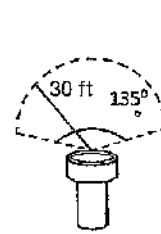
13. The napkin ring has a height of 4 inches and a thickness of 0.3 inches. The diameter of the hole in the center is 3.8 inches as shown.



If the napkin ring is made of solid silver, approximately what is the volume of silver in the napkin ring? Give your answer to the nearest tenth of a cubic centimeter.

$$4.92 \pi \text{ cm}^3 \approx 15.5 \text{ cm}^3$$

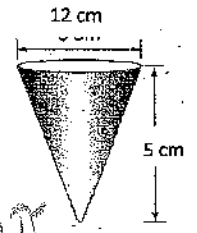
14. A flood light in a storage yard spreads light over a distance of 30 feet and is set to rotate through an angle of 135° .



$$\frac{135}{360} \cdot \pi (30)^2 = \frac{675\pi}{2} \approx 1,060.4 \text{ ft}^2$$

How many square feet of the yard will be lit by the flood light?

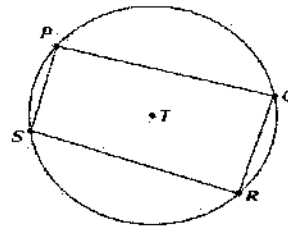
15. The cup dispenser at a water cooler contains cone-shaped paper cups with the dimensions shown.



Approximately how many cubic centimeters of water can each cup hold?

$$V = \frac{1}{3} \pi (6)^2 (5) = 60\pi \approx 188 \text{ cm}^3$$

16. The diagram shows the vertices of quadrilateral PQRS which lie on Circle T.

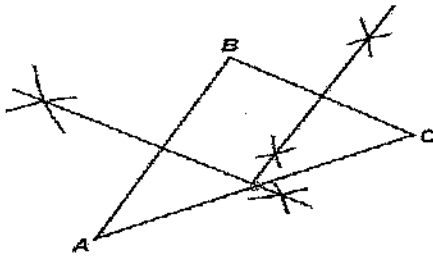


What can be proven to be true about quadrilateral PQRS?

$$\angle S + \angle Q = 180^\circ$$

$$\angle P + \angle R = 180^\circ$$

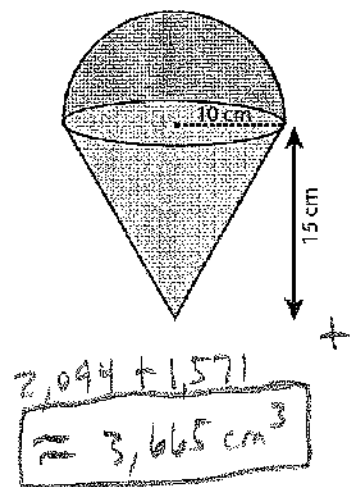
17. Russell is done with part of a construction, as shown below.



Neil states that Russell is constructing the inscribed circle of triangle ABC, and Eileen states that Russell is constructing the circumscribed circle of triangle ABC. Who is correct about the type of construction that Russell is creating? *Eileen*

18. Be sure you can identify the various types of arcs on a circle. *minor (<180°), major (>180°)*

19. What is the volume of the figure below? *Semi circle = 180*



$$V = \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right)$$

$$= \frac{1}{2} \left(\frac{4}{3} \pi \cdot 10^3 \right)$$

$$\approx 2,094 \text{ cm}^3$$

$$+ V = \frac{1}{3} \pi r^2 h$$

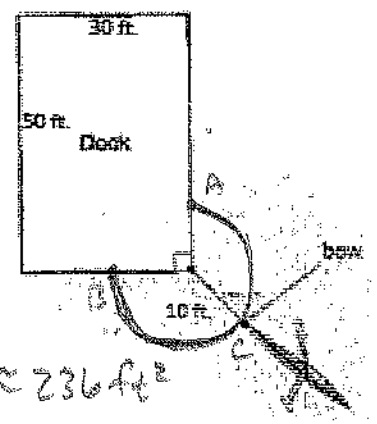
$$V = \frac{1}{3} \pi (10)^2 (15)$$

$$V \approx 1,571 \text{ cm}^3$$

$$2,094 + 1,571$$

$$\approx 3,665 \text{ cm}^3$$

20. A dock that is anchored in the middle of a lake is 30 feet wide and 50 feet long. The bow (front end) of a kayak is tied to a corner of the dock by a rope that is 10 feet long as shown.



A. Use your compass to draw the section of the lake in which the bow of the kayak can drift. Use letters to name angles and endpoints that are part of your drawing. Describe the geometric figure you drew and what it indicates about where the bow can drift. *270°*

B. What is the approximate area, in square feet, in which the bow of the kayak can drift? Show all of your work. $\frac{270}{360} \cdot \pi (10)^2 \approx 75\pi \approx 236 \text{ ft}^2$

C. If the 10-foot long rope is replaced with a rope that is 6 feet long, how will the area in which the bow can drift change? Show and/or explain your work.

Smaller
27ππ $48\pi \approx 151 \text{ ft}^2$ *smaller*

Bonus:

Point P is outside circle Q. Construct two lines through point P that are tangent to circle Q. Show all your work.

