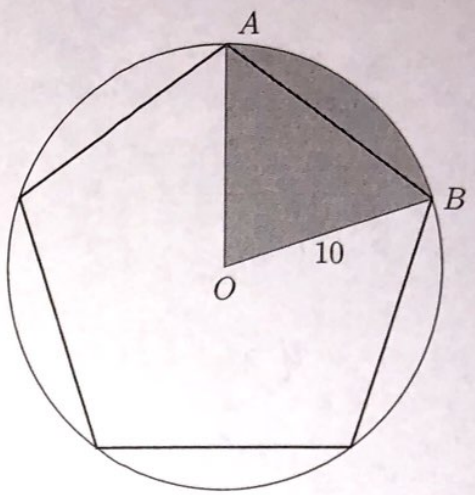
8.3 Classwork: Density

1. A pentagon is inscribed in circle O, as shown below. The circle has radius $r = 10$.



(a) Find the area of the sector AOB.

$A = \frac{1}{5}\pi 10^2 = 20\pi$

(b) Find the perimeter of the sector AOB.

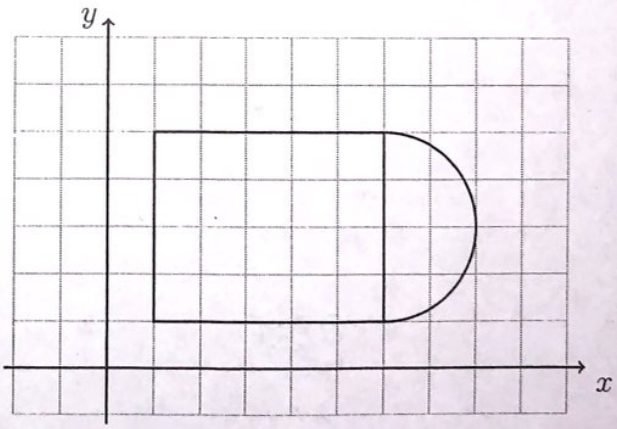
$P = 10 + 10 + \frac{1}{5}(2\pi 10)$
$= 20 + 4\pi$

2. A cylinder is 12.3 cm tall and has a volume of 966 cubic cm. Find the area of the base of the cylinder. Express your result to the *nearest hundredth of a square centimeter.*

$V = Bh = 966$
$B\,12.3 = 966$
$B = 78.5536\ldots \approx 78.54$

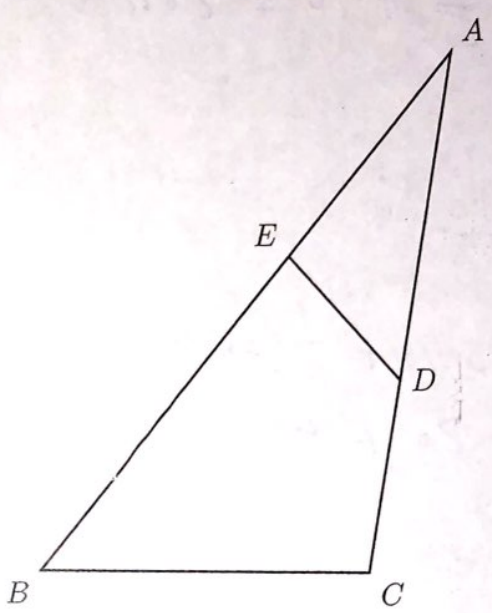
3. Find the area of the shape shown below composed of a rectangle and a semi-circle.

$A = 4.5 + \frac{1}{2}\pi 2^2$
$= 2 + 2\pi$



Estimating and measuring

4. The diagram below shows $\triangle ABC \sim \triangle ADE$, with $\overline{AEB}$, $\overline{ADC}$. $AB = 12$, $AD = 6$. Estimate BC, assuming that the diagram below is drawn to scale.



Write the actual lengths of

(a) $AB =$ 9 cm

(b) $AD =$ 4.5

(c) $BC =$ 4.5

(d) Find the scale factor, k

$k = \frac{9}{4.5} = 2$ $\frac{12}{6} = \frac{4}{3}$

(e) Calculate $BC =$

$BC = 4.5 \cdot \frac{4}{3} = 6.0$

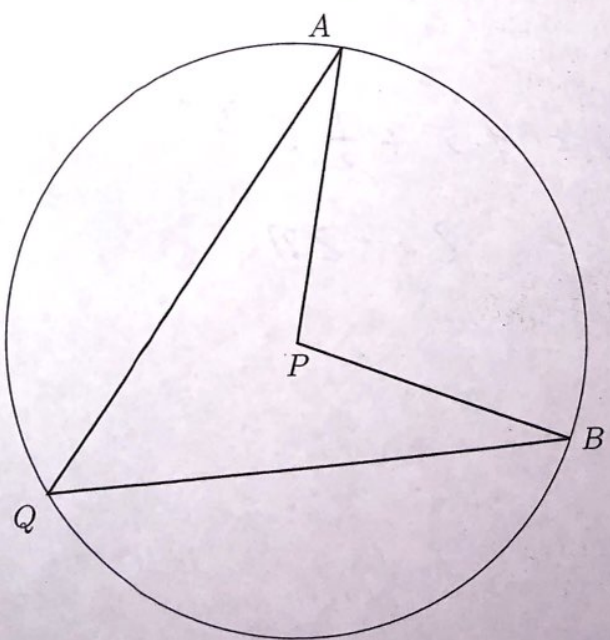
5. Given the circle with center P with central angle $\angle APB$ and inscribed angle $\angle AQB$. Using a protractor, measure each angle.

(a) $m\angle APB =$ 100°

(b) $m\angle AQB =$ 50°

(c) What do you think is the ratio of the central angle to the inscribed angle?

2:1



Applying density ratios

6. Find the weight of a metal block with a volume of 20 cubic inches and a density of 0.75 pounds per cubic inch.

$W = 20 \times 0.75 = 15$ lbs

7. A large block of ice has a volume of 45 liters. The density of ice (water) is one kilogram per liter. Find the weight of the ice.

$W = 45 \times 1 = 45$ kg

8. A tank of gasoline holds 20 gallons. Find the cost to completely fill the tank if gasoline costs \$2.35 per gallon.

$C = 20 \times 2.35 = \$47.00$

9. A bar of solid gold is in the shape of a rectangular prism having a length of 10 cm, width of 4 cm, and thickness of 1.5 cm. The density of gold is 19.3 grams per cubic cm, and its approximate market value is \$50 per gram.

   (a) Find the weight of the bar of gold.

$V = 10 \cdot 4 \cdot 1.5 = 60$ cm^3

$W = 60 \times 19.3 = 1158$

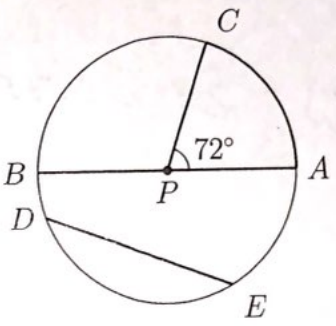
   (b) Find its value in dollars.

Value $= 1158 \times 50$

$= \$57,900$

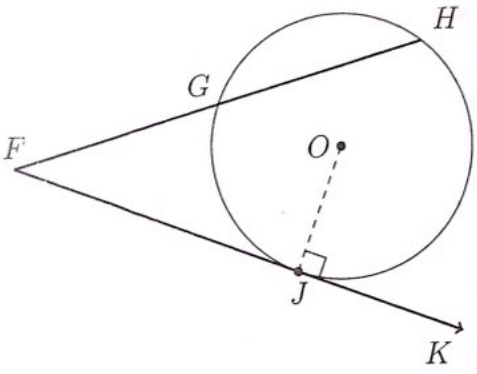
Vocabulary self-assessment: Circles (fill in the blank with the correct term)

10. **Internal line segments:** Circle with center at point P, as shown.



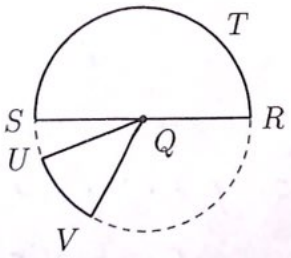
- $\overline{AB}$ diameter
- $\overline{CP}$ radius
- $\overline{DE}$ chord
- $\angle APC$ central angle
- $\overline{\overset{\frown}{AC}}$ arc

11. **External lines:** Circle with center at point O, at right.



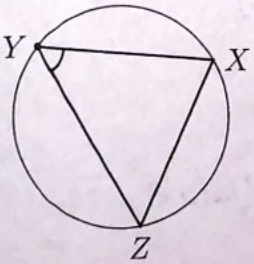
- $\overline{FGH}$ Secant
- $\overline{OJ}$ radius
- $\overline{FJK}$ tangent
- J point of tangency

12. **Areas:** Circle with center at point Q.



- $\overline{RS}$ diameter
- RST semi-circle
- QUV sector

13. **Polygons and angles in circles:**



- $\triangle XYZ$ inscribed triangle
- $\angle XYZ$ inscribed angle