

8.2 Estimating and measuring angles, length, and area

1. Find the area of a semi-circle with radius of 7 centimeters.

$$A = \frac{1}{2} \pi 7^2 = \frac{49}{2} \pi = 76.9690... \approx 77.0$$

2. Given circle O with radius $OB = 3$ cm.

- (a) Find the circumference of circle O .

$$C = 2\pi 3 = 6\pi = 18.84955... \approx 18.8$$

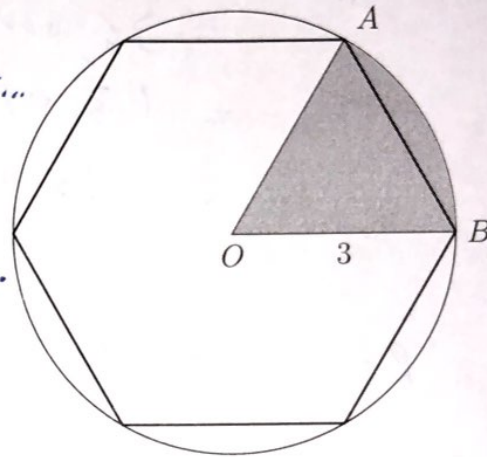
- (b) Find the area of the circle.

$$A = \pi 3^2 = 9\pi = 28.2743... \approx 28.3$$

- (c) A hexagon is inscribed in the circle, with A and B two of its vertices.

Find the area of the sector AOB .

$$A_H = \frac{1}{6} (9\pi) = \frac{3}{2} \pi = 4.71238... \approx 4.71$$



3. Find the volume of a pyramid ($V = \frac{1}{3}Bh$) having a height of 11.3 inches and with a square base having side lengths of 7 inches. Express your result to the nearest cubic inch.

$$\begin{aligned} V &= \frac{1}{3} (7^2) 11.3 \\ &= 184.56\overline{6} \\ &\approx 185 \text{ in}^3 \end{aligned}$$

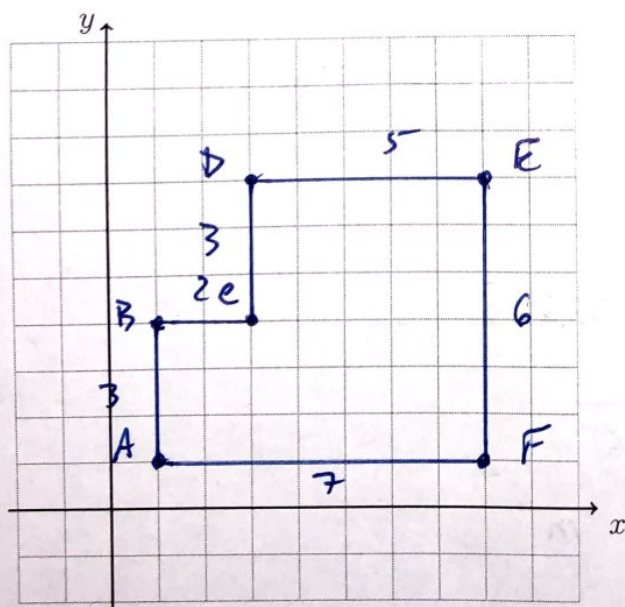
4. Find the volume of a hemisphere with a radius of 30 inches, to the nearest whole cubic inch. (The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$)

$$\begin{aligned} V_{H-S} &= \frac{4}{3} \pi 30^3 \\ &= 36,000\pi = \cancel{113,097.3355...} \\ &= 113,097.3355... \\ &\approx 113,097 \text{ in}^3 \end{aligned}$$

5. Given $R(-2, 0)$ and $S(3, 5)$, find the length of \overline{RS} . Simplify the radical.

$$\begin{aligned} RS &= \sqrt{(3-0)^2 + (5-(-2))^2} \\ &= \sqrt{3^2 + 7^2} \\ &= \sqrt{58} = 7.61577... \approx 7.62 \end{aligned}$$

6. On the graph, draw polygon ABCDEF with vertices $A(1, 1)$, $B(1, 4)$, $C(3, 4)$, $D(3, 7)$, $E(8, 7)$, and $F(8, 1)$. Find the perimeter and the area of the polygon.

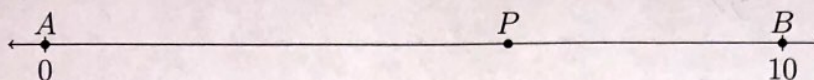


$$\begin{aligned} P &= 5 + 3 + 2 + 3 + 7 + 6 \\ &= 26 \end{aligned}$$

$$\begin{aligned} A &= (5 \cdot 6) + (3 \cdot 2) \\ &= 36 \end{aligned}$$

Estimating and measuring

7. The point P falls $A(0)$ and $B(10)$ on the numberline \overleftrightarrow{AB} as shown below.



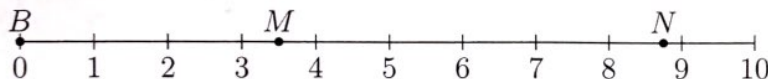
- (a) Estimate the value of P without using any tools.

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- (b) Find the position of P as accurately as you can with a ruler.

6.25

8. The distance from B on the line is scaled so that each centimeter represents one foot.



- (a) Estimate the distance of M from B in feet and inches (by eye).

3' 6"

- (b) Using a ruler, find the distance between M and N in feet and inches.

5.25 cm = 5' 3"

9. Given the circle O with diameter $D = 4$.

- (a) Estimate the area by counting the squares in the grid.

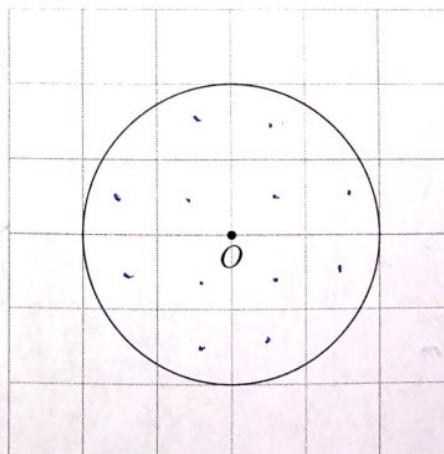
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- (b) Calculate the area.

$$A = \pi 2^2 = 12.5663... \\ \approx 12.6$$

- (c) Quantify the error in your estimate as a percentage.

$$E = \frac{12.5663... - 12}{12.5663...} = 4.50703... \% \\ \approx 4.51 \%$$



10. Given circle O with chords \overline{AD} and \overline{BE} intersecting at C , as shown in the diagram, which is drawn to scale. Use a protractor to measure each angle and a ruler for (e).

(a) Find the $m\angle A$. 35°

(b) Find the $m\angle B$. 50°

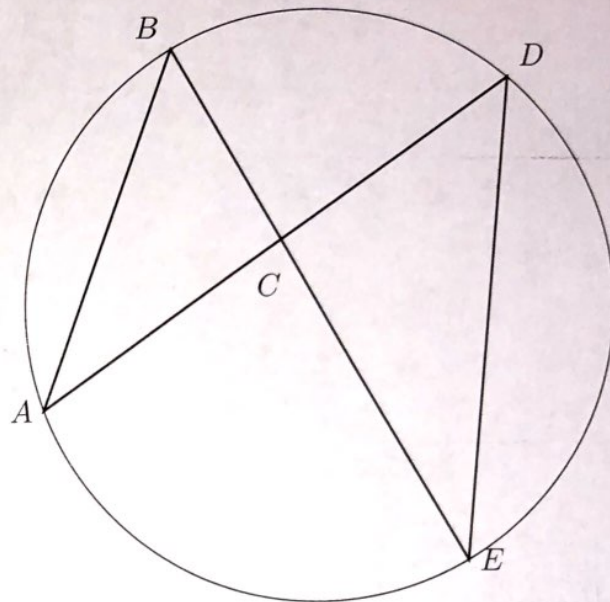
(c) Find the $m\angle D$. 50°

(d) Find the $m\angle E$. 35°

(e) Given that $BE = 8$

Find BC . 3

(f) Find EC . 5



11. The diagram below is drawn to scale. Given that $BE = 10$ and $DE = 5$, find AC .

