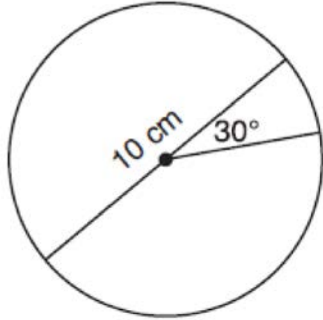


**G.C.B.5: Sectors**

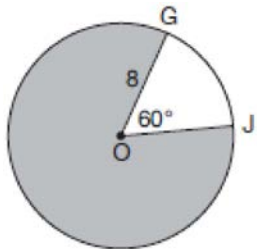
- 1 A circle with a diameter of 10 cm and a central angle of  $30^\circ$  is drawn below.



What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the  $30^\circ$  angle?

- 1) 5.2
- 2) 6.5
- 3) 13.1
- 4) 26.2

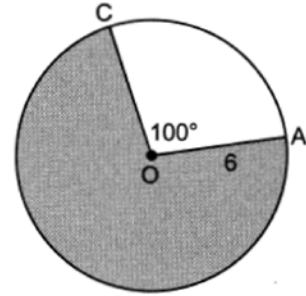
- 2 In the diagram below of circle  $O$ ,  $GO = 8$  and  $m\angle GOJ = 60^\circ$ .



What is the area, in terms of  $\pi$ , of the shaded region?

- 1)  $\frac{4\pi}{3}$
- 2)  $\frac{20\pi}{3}$
- 3)  $\frac{32\pi}{3}$
- 4)  $\frac{160\pi}{3}$

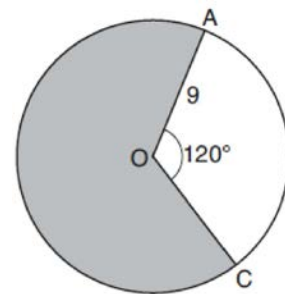
- 3 In circle  $O$  below,  $OA = 6$ , and  $m\angle COA = 100^\circ$ .



What is the area of the shaded sector?

- 1)  $10\pi$
- 2)  $26\pi$
- 3)  $\frac{10\pi}{3}$
- 4)  $\frac{26\pi}{3}$

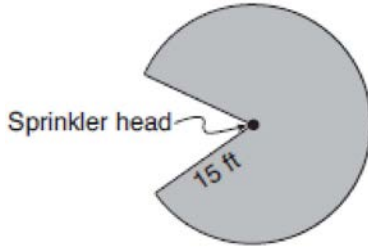
- 4 Circle  $O$  with a radius of 9 is drawn below. The measure of central angle  $AOC$  is  $120^\circ$ .



What is the area of the shaded sector of circle  $O$ ?

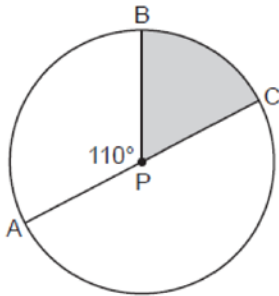
- 1)  $6\pi$
- 2)  $12\pi$
- 3)  $27\pi$
- 4)  $54\pi$

- 5 Cerise waters her lawn with a sprinkler that sprays water in a circular pattern at a distance of 15 feet from the sprinkler. The sprinkler head rotates through an angle of  $300^\circ$ , as shown by the shaded area in the accompanying diagram.



What is the area of the lawn, to the *nearest square foot*, that receives water from this sprinkler?

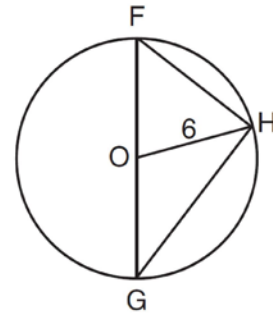
- 1) 79
  - 2) 94
  - 3) 589
  - 4) 707
- 6 In circle  $P$  below, diameter  $\overline{AC}$  and radius  $\overline{BP}$  are drawn such that  $m\angle APB = 110^\circ$ .



If  $AC = 12$ , what is the area of shaded sector  $BPC$ ?

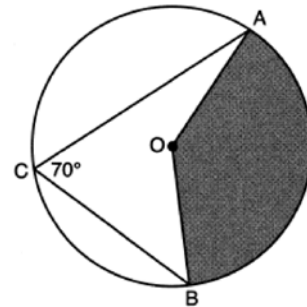
- 1)  $\frac{7}{6}\pi$
- 2)  $7\pi$
- 3)  $11\pi$
- 4)  $28\pi$

- 7 Triangle  $FGH$  is inscribed in circle  $O$ , the length of radius  $\overline{OH}$  is 6, and  $\overline{FH} \cong \overline{OG}$ .



What is the area of the sector formed by angle  $FOH$ ?

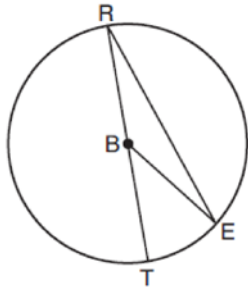
- 1)  $2\pi$
  - 2)  $\frac{3}{2}\pi$
  - 3)  $6\pi$
  - 4)  $24\pi$
- 8 In the diagram below of circle  $O$ ,  $\overline{AC}$  and  $\overline{BC}$  are chords, and  $m\angle ACB = 70^\circ$ .



If  $OA = 9$ , the area of the shaded sector  $AOB$  is

- 1)  $3.5\pi$
- 2)  $7\pi$
- 3)  $15.75\pi$
- 4)  $31.5\pi$

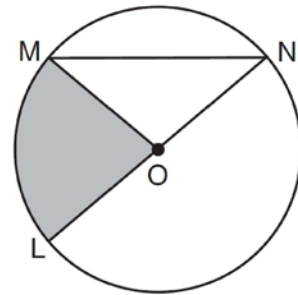
- 9 In circle  $B$  below, diameter  $\overline{RT}$ , radius  $\overline{BE}$ , and chord  $\overline{RE}$  are drawn.



If  $m\angle TRE = 15^\circ$  and  $BE = 9$ , then the area of sector  $EBR$  is

- 1)  $3.375\pi$
- 2)  $6.75\pi$
- 3)  $33.75\pi$
- 4)  $37.125\pi$

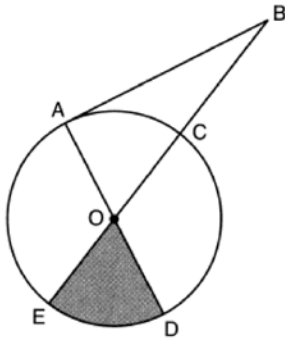
- 11 In the diagram below of circle  $O$ , the area of the shaded sector  $LOM$  is  $2\pi \text{ cm}^2$ .



If the length of  $\overline{NL}$  is 6 cm, what is  $m\angle N$ ?

- 1)  $10^\circ$
- 2)  $20^\circ$
- 3)  $40^\circ$
- 4)  $80^\circ$

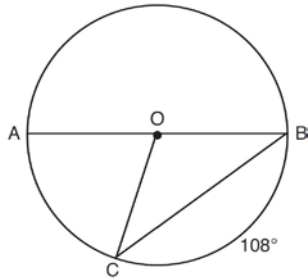
- 10 In the diagram below of circle  $O$ , tangent  $\overline{AB}$  is drawn from external point  $B$ , and secant  $\overline{BCOE}$  and diameter  $\overline{AOD}$  are drawn.



If  $m\angle OBA = 36^\circ$  and  $OC = 10$ , what is the area of shaded sector  $DOE$ ?

- 1)  $\frac{3\pi}{10}$
- 2)  $3\pi$
- 3)  $10\pi$
- 4)  $15\pi$

- 12 In circle  $O$ , diameter  $\overline{AB}$ , chord  $\overline{BC}$ , and radius  $\overline{OC}$  are drawn, and the measure of arc  $BC$  is  $108^\circ$ .



Some students wrote these formulas to find the area of sector  $COB$ :

Amy  $\frac{3}{10} \cdot \pi \cdot (BC)^2$

Beth  $\frac{108}{360} \cdot \pi \cdot (OC)^2$

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

Dex  $\frac{108}{360} \cdot \pi \cdot \frac{1}{2}(AB)^2$

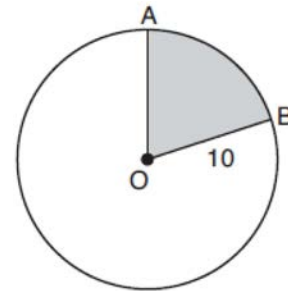
Which students wrote correct formulas?

- 1) Amy and Dex
  - 2) Beth and Carl
  - 3) Carl and Amy
  - 4) Dex and Beth
- 13 The area of a sector of a circle with a radius measuring 15 cm is  $75\pi$  cm<sup>2</sup>. What is the measure of the central angle that forms the sector?
- 1)  $72^\circ$
  - 2)  $120^\circ$
  - 3)  $144^\circ$
  - 4)  $180^\circ$

- 14 What is the area of a sector of a circle with a radius of 8 inches and formed by a central angle that measures  $60^\circ$ ?

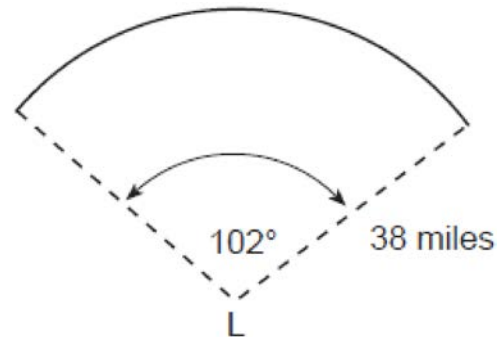
- 1)  $\frac{8\pi}{3}$
- 2)  $\frac{16\pi}{3}$
- 3)  $\frac{32\pi}{3}$
- 4)  $\frac{64\pi}{3}$

- 15 In the diagram below, circle  $O$  has a radius of 10.



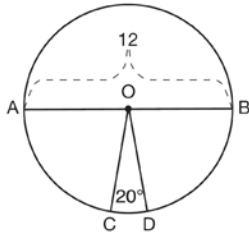
If  $m\widehat{AB} = 72^\circ$ , find the area of shaded sector  $AOB$ , in terms of  $\pi$ .

- 16 The diagram below models the projection of light from a lighthouse,  $L$ . The sector has a radius of 38 miles and spans  $102^\circ$ .



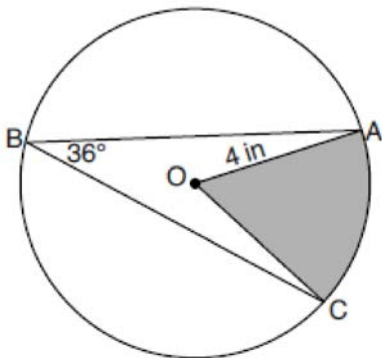
Determine and state the area of the sector, to the nearest square mile.

- 17 In the diagram below of circle  $O$ , diameter  $\overline{AB}$  and radii  $\overline{OC}$  and  $\overline{OD}$  are drawn. The length of  $\overline{AB}$  is 12 and the measure of  $\angle COD$  is 20 degrees.



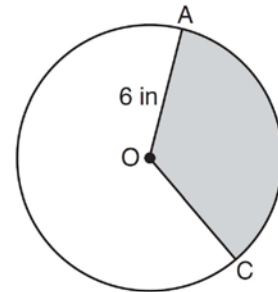
If  $\widehat{AC} \cong \widehat{BD}$ , find the area of sector  $BOD$  in terms of  $\pi$ .

- 18 In the diagram below of circle  $O$ , the measure of inscribed angle  $ABC$  is  $36^\circ$  and the length of  $\overline{OA}$  is 4 inches.

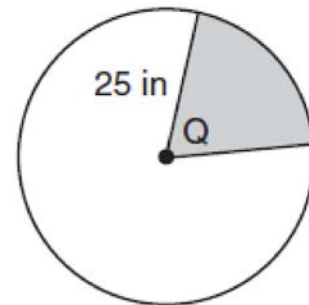


Determine and state, to the *nearest tenth of a square inch*, the area of the shaded sector.

- 19 In the diagram below of circle  $O$ , the area of the shaded sector  $AOC$  is  $12\pi \text{ in}^2$  and the length of  $\overline{OA}$  is 6 inches. Determine and state  $m\angle AOC$ .



- 20 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is  $500\pi \text{ in}^2$ .



Determine and state the degree measure of angle  $Q$ , the central angle of the shaded sector.

- 21 A circle has a radius of 6.4 inches. Determine and state, to the *nearest square inch*, the area of a sector whose arc measures  $80^\circ$ .
- 22 Determine and state, in terms of  $\pi$ , the area of a sector that intercepts a  $40^\circ$  arc of a circle with a radius of 4.5.

**G.C.B.5: Sectors****Answer Section**

1 ANS: 2

$$\frac{30}{360} (5)^2 (\pi) \approx 6.5$$

REF: 081818geo

2 ANS: 4

$$\frac{300}{360} \cdot 8^2 \pi = \frac{160\pi}{3}$$

REF: 011721geo

3 ANS: 2

$$\left( \frac{360 - 100}{360} \right) (\pi) (6^2) = 26\pi$$

REF: 062411geo

4 ANS: 4

$$\left( \frac{360 - 120}{360} \right) (\pi) (9^2) = 54\pi$$

REF: 081912geo

5 ANS: 3

The area of the entire circle is  $15^2 \pi = 225\pi$ . The shaded area has an area of  $225\pi \times \frac{300}{360} \approx 589$

REF: 060716b

6 ANS: 2

$$\frac{70}{360} \cdot 6^2 \pi = 7\pi$$

REF: 082309geo

7 ANS: 3

$$\frac{60}{360} \cdot 6^2 \pi = 6\pi$$

REF: 081518geo

8 ANS: 4

$$\frac{140}{360} \cdot 9^2 \pi = 31.5\pi$$

REF: 012317geo

9 ANS: 3

$$\frac{150}{360} \cdot 9^2 \pi = 33.75\pi$$

REF: 012013geo

10 ANS: 4

$$\frac{54}{360} \cdot 10^2 \pi = 15\pi$$

REF: 062224geo

11 ANS: 3

$$\frac{x}{360} \cdot 3^2 \pi = 2\pi \quad 180 - 80 = 100$$

$$x = 80 \quad \frac{180 - 100}{2} = 40$$

REF: 011612geo

12 ANS: 2 REF: 081619geo

13 ANS: 2

$$\frac{x}{360} (15)^2 \pi = 75\pi$$

$$x = 120$$

REF: 011914geo

14 ANS: 3

$$\frac{60}{360} \cdot 8^2 \pi = \frac{1}{6} \cdot 64\pi = \frac{32\pi}{3}$$

REF: 061624geo

15 ANS:

$$\frac{72}{360} (\pi)(10^2) = 20\pi$$

REF: 061928geo

16 ANS:

$$\frac{102}{360} (\pi)(38^2) \approx 1285$$

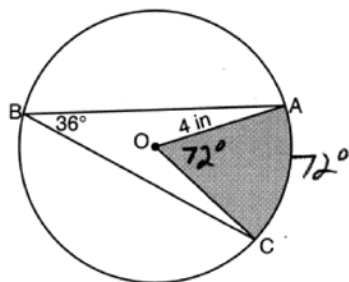
REF: 012426geo

17 ANS:

$$\frac{\left(\frac{180-20}{2}\right)}{360} \times \pi(6)^2 = \frac{80}{360} \times 36\pi = 8\pi$$

REF: spr1410geo

18 ANS:



$$\left(\frac{72}{360}\right)\pi(4)^2 \approx 10.1$$

REF: 082231geo

19 ANS:

$$A = 6^2 \pi = 36\pi \quad 36\pi \cdot \frac{x}{360} = 12\pi$$

$$x = 360 \cdot \frac{12}{36}$$

$$x = 120$$

REF: 061529geo

20 ANS:

$$\frac{Q}{360}(\pi)(25^2) = (\pi)(25^2) - 500\pi$$

$$Q = \frac{125\pi(360)}{625\pi}$$

$$Q = 72$$

REF: 011828geo

21 ANS:

$$\frac{80}{360} \cdot \pi(6.4)^2 \approx 29$$

REF: 062328geo

22 ANS:

$$\frac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$$

REF: 061726geo