

**Topic:** Area of a circular sector

**Question:** Find the area of the circular sector.

Consider a circle of radius 5 miles, and find the area  $A$  (in square miles) of a sector of that circle which subtends a central angle of 135 degrees.

**Answer choices:**

A  $A = \frac{75}{8}$

B  $A = \pi \left( \frac{75}{8} \right)$

C  $A = \frac{5,625}{2}$

D  $A = \pi \left( \frac{5,625}{2} \right)$



**Solution: B**

Since the central angle  $\theta$  is in degrees, the area of such a circular sector is

$$A = \pi r^2 \left( \frac{\theta}{360} \right)$$

$$A = \pi (5^2) \left( \frac{135}{360} \right)$$

$$A = \pi (25) \left( \frac{3}{8} \right)$$

$$A = \pi \left( \frac{75}{8} \right)$$



**Topic:** Area of a circular sector**Question:** Find the area of the circular sector.

Find the area  $A$  (in square centimeters) of the sector of a circle of radius 6 centimeters if that sector is bounded by an arc that subtends a central angle of  $(7/4)\pi$  radians.

**Answer choices:**

A  $A = \frac{63}{2}\pi$

B  $A = \frac{63}{2}$

C  $A = \pi \left( \frac{7}{2} \right)$

D  $A = 7\pi$



**Solution: A**

Since the central angle  $\theta$  is in radians, the area of such a circular sector is

$$A = r^2 \left( \frac{\theta}{2} \right)$$

$$A = (6^2) \left( \frac{\frac{7}{4}\pi}{2} \right)$$

$$A = 36 \left( \frac{7\pi}{8} \right)$$

$$A = \left[ \frac{36(7)}{8} \right] \pi$$

$$A = \left[ \frac{9(7)}{2} \right] \pi$$

$$A = \frac{63}{2} \pi$$



**Topic:** Area of a circular sector**Question:** Find the area of the circular sector.

Find the area of a sector of a circle that passes through the point  $(-2,4)$  and has its center at the point  $(-6,1)$  if the arc which bounds that sector subtends a central angle of 150 degrees.

**Answer choices:**

A  $A = 20\pi$

B  $A = \pi \left( \frac{125}{6} \right)$

C  $A = 125$

D  $A = \pi \left( \frac{125}{12} \right)$



**Solution: D**

Since the center of the circle is at  $(-6,1)$ , every point of this circle satisfies the equation

$$[x - (-6)]^2 + (y - 1)^2 = r^2$$

where  $r$  is the radius. Also, this circle passes through the point  $(-2,4)$ , so letting  $(x, y) = (-2,4)$ , we can find the radius:

$$[-2 - (-6)]^2 + (4 - 1)^2 = r^2$$

$$4^2 + 3^2 = r^2$$

$$16 + 9 = r^2$$

$$25 = r^2$$

Since  $r$  must be positive, we see that  $r = \sqrt{25} = 5$ .

Now we can compute the area  $A$  of a sector of this circle which is bounded by an arc that subtends a central angle of 150 degrees:

$$A = \pi r^2 \left( \frac{\theta}{360} \right)$$

$$A = \pi (5^2) \left( \frac{150}{360} \right)$$

$$A = \pi(25) \left( \frac{5}{12} \right)$$



$$A = \pi \left[ \frac{25(5)}{12} \right]$$

$$A = \pi \left( \frac{125}{12} \right)$$

