



Problem of the Week

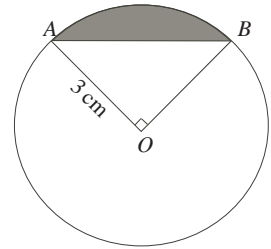
Grade 7 and 8

A Bit of Shade Please

Solution

Problem

In the diagram, $\angle AOB = 90^\circ$ and the radius of the circle is $OA = 3$ cm. Determine the area of the shaded region correct to one decimal place.



Solution

The triangle plus the shaded area cover $\frac{1}{4}$ of the area of the circle. To find the shaded area we need to find the area of the triangle and subtract it from the area of $\frac{1}{4}$ of a circle with radius 3 cm.

Since $\angle AOB = 90^\circ$, AO and OB meet at 90° , we can use OA as the base and OB as the height in the formula for the area of a triangle, $\text{base} \times \text{height} \div 2$.

$$\text{Area } \triangle AOB = (AO) \times (OB) \div 2 = (3) \times (3) \div (2) = 9 \div 2 = 4.5 \text{ cm}^2.$$

To find the area of the quarter circle we will use the formula πr^2 and divide the result by 4.

$$\text{Area of Quarter Circle} = \pi \times r^2 \div 4 = \pi \times 3^2 \div 4 = \pi \times 9 \div 4 = 2.25\pi \text{ cm}^2.$$

We can now determine the shaded area.

$$\text{Shaded area} = \text{Area of Quarter Circle} - \text{Area of Triangle} = 2.25\pi - 4.5 \doteq 2.6 \text{ cm}^2.$$

Therefore, the shaded area is approximately 2.6 cm^2 .

