Year 4 Math Assignment 5: Circular Measure (Solutions)

Q1 Convert the following angles to radians. Give your answers in terms of π.

(a) 150° $\frac{5\pi}{6}$ (b) 210° $\frac{7\pi}{6}$ (c) 255° $\frac{17\pi}{12}$ (d) 330° $\frac{11\pi}{6}$

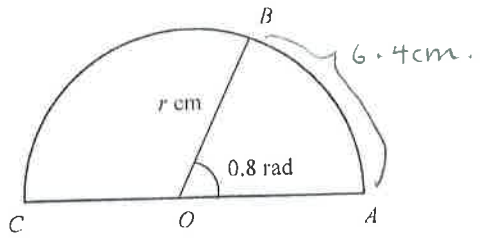
Q2 Convert the following angles to degrees.

(a) $\frac{\pi}{8}$ rad 22.5° (b) $\frac{2\pi}{3}$ rad 120° (c) 2.15 rad 123.2° (d) 3.51 rad 201.1°

Q3 The diagram shows a semicircle $OABC$. If the arc AB has length 6.4 cm, calculate

(a) the length of the radius

(b) the length of the arc BC.



(a) $r\theta = 6.4$

$r = 8$ cm

(b) $BC = 8(\pi - 0.8)$

$= 18.7$ cm

Q4 The diagram shows a sector AOB whose angle is θ radians. Find

(a) the value of θ if the arc AB has a length 14 cm,

(b) the length of the arc AB if $\theta = 0.6$,

(c) the area of the sector if the arc AB has length 5 cm

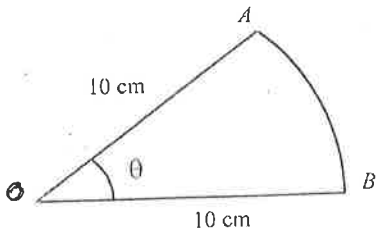
(d) the length of the arc AB if the area of the sector is 30 cm^2.

(a) $r\theta = 14$

$\theta = 1.4$ rad

(b) $r\theta = 10(0.6)$

$= 6$ cm



(c) $r\theta = 5$

$\theta = 0.5$ rad

Area $= \frac{1}{2}r^2\theta$

$= \frac{1}{2}(10)^2(0.5)$

$= 25\ cm^2$

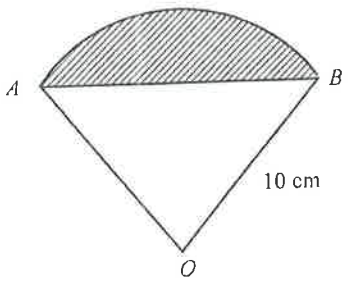
(d) $\frac{1}{2}r^2\theta = 30$

$\theta = 0.6$ rad $\therefore$ length $= 6$ cm

Q5 The diagram shows part of a circle, centre O, radius 10 cm. Given that the length of the arc AB is 14 cm, calculate,

(a) the angle AOB in radians.

(b) the area of the shaded region.



a) $r\theta = 14$

$\theta = \frac{14}{10}$

$= 1.4$ rad

b) Area of shaded region $= \frac{1}{2}r^2(\theta - \sin\theta)$

$= \frac{1}{2}(10)^2(1.4 - \sin 1.4)$

$= 20.7\ cm^2$

Q6) 5π kradians

Q7) $x = r\sin\theta$

$y = r\cos\theta$

$z = r - r\cos\theta$

No. AC is not a chord and ABC is not a segment. Trigonometry can be used to find AC.