

Radian Measure

Activity Sheet 2

1) An identity already derived (in Q 11 on Activity Sheet 1) was that π radians = 180° . This identity is very useful to easily convert degrees to radians or radians to degrees.

(i) Use the identity π radians = 180° **as your starting point** show how to convert:

(a) 200° to radians

(b) $\frac{7\pi}{6}$

(c) $1\frac{1}{2}$ radians to degrees

(ii) Convert each of the following to degrees to radians or radians to degrees as required.

	Radians	Degrees		Radians	Degrees
1		60°	10	$\frac{\pi}{4}$	
2		30°	11	$\frac{\pi}{3}$	
3		70°	12	$\frac{2\pi}{5}$	
4		120°	13	$\frac{5\pi}{4}$	
5		80°	14	$\frac{5\pi}{6}$	
6		75°	15	4π	
7		12°	16	2	
8		300°	17	4.5	
9		720°	18	6	

2) (a) Draw any circle and **construct** an angle of 2 radians

(b) Using the identity derived at Q10 on Activity Sheet 1 find the length of the arc of this angle algebraically.

(c) Using a protractor, measure the size of this angle in degrees _____

Comment on whether this is the degree measure you expected:

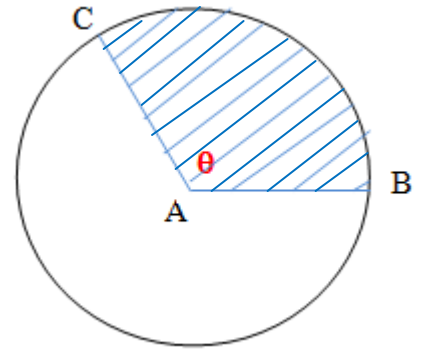
3) (a) Construct a circle of radius 5cm (b) Construct an arc of 20cm on this circle.

(c) Write down the size of the angle subtended at the centre of this circle in radians

(d) Using the identity from derived at *Q10 on Activity Sheet 1* verify your answer from (c) algebraically.

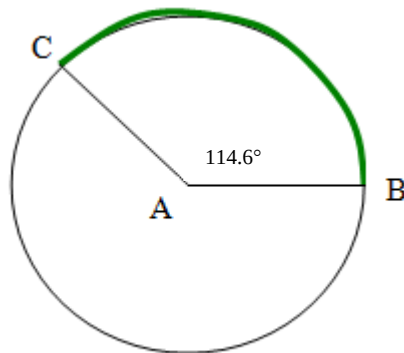
- 4) The diagram shows a shaded sector ABC .
 Show how the identity,
 Area of Sector = $\frac{1}{2} r^2 \theta$ is derived,
 where r is the length of the radius.
 and θ is the angle of the sector measured in radians

Hint: Area of Sector = Area of full circle $\times \frac{\text{Angle (in radians)}}{\text{Full circle (in radians)}}$



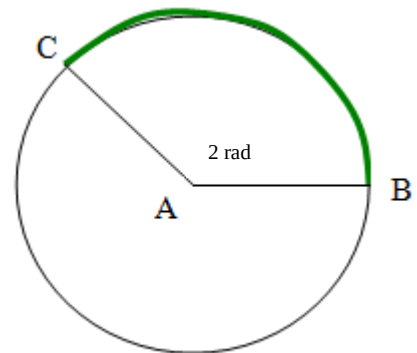
- 5) (a) This question looks at the area of a sector of a circle. It investigates using both degrees and radians to get the area of a sector and compares the answers.

Calculate the area of the sector
 of angle 114.6°
 in a circle of
 radius 7cm.



Area of sector = _____

Calculate the area of the sector
 of angle 2 radians
 in a circle of
 radius 7cm.



Area of sector = _____

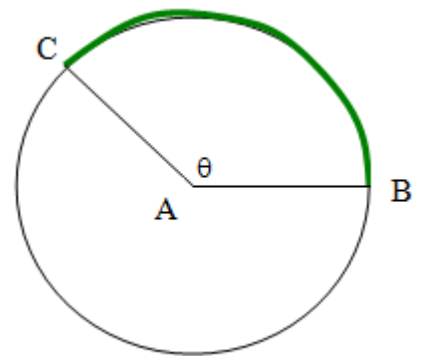
(b) Why were 114.6° and 2 radians used ?

(c) Comment on the two answers.

6) The circle on the right has a minor arc length BC of 10cm.
The angle θ is 143.24° .

(a) Write down an approximation for θ in radians _____

(b) Show how to calculate θ in radians (to 1 decimal place)



(c) Calculate the radius of the circle

7) Each of the circles below has a radius of 8cm.

(a) Calculate the size of the angle (in radians) of a sector in a circle which has radius 8cm and area of sector of 67cm^2 to nearest cm.

(b) Identify which one of the circles below has a blue sector of area 67cm^2 (to nearest cm) and explain your choice.

