Example 5 Self Tutor

A sector has radius 12 cm and angle 3 radians. Find its:

a arc length **b** area

a arc length $= \theta r$
$= 3 \times 12$
$= 36$ cm

b area $= \frac{1}{2}\theta r^2$
$= \frac{1}{2} \times 3 \times 12^2$
$= 216$ cm^2

EXERCISE 8B

1 Use radians to find the arc length and area of a sector of a circle of:

a radius 9 cm and angle $\frac{7\pi}{4}$ **b** radius 4.93 cm and angle 4.67 radians.

2 A sector has an angle of $107.9°$ and an arc length of 5.92 m. Find its:

a radius **b** area.

3 A sector has an angle of 1.19 radians and an area of 20.8 cm^2. Find its:

a radius **b** perimeter.

Example 6 Self Tutor

Find the area of a sector with radius 8.2 cm and arc length 13.3 cm.

$l = \theta r \quad \{\theta \text{ in radians}\}$

$\therefore \ \theta = \frac{l}{r} = \frac{13.3}{8.2}$

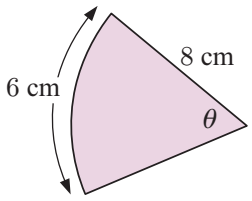
$\therefore$ area $= \frac{1}{2}\theta r^2$
$= \frac{1}{2} \times \frac{13.3}{8.2} \times 8.2^2$
≈ 54.5 cm^2

4 Find, in radians, the angle of a sector of:

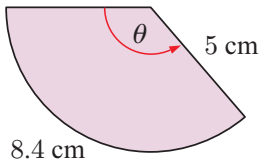
a radius 4.3 m and arc length 2.95 m **b** radius 10 cm and area 30 cm^2.

5 Find θ (in radians) for each of the following, and hence find the area of each figure:

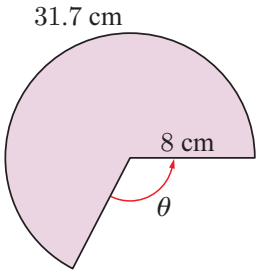
a



b



c



6 Find the arc length and area of a sector of radius 5 cm and angle 2 radians.

7 If a sector has radius $2x$ cm and arc length x cm, show that its area is x^2 cm^2.