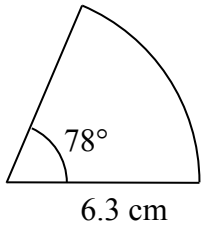
SECTORS

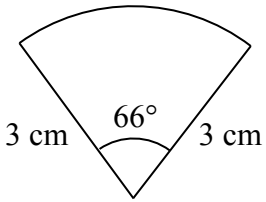
ARC LENGTH AND PERIMETER

Ref: G426. 1R1

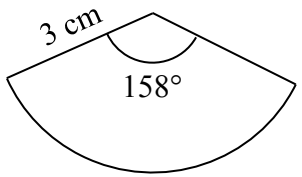
A1 Find the length of the arc



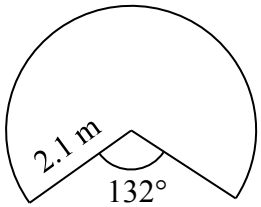
A2 Work out the perimeter



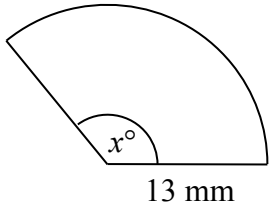
A3 Find the length of the arc



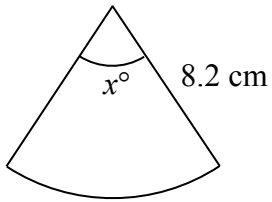
A4 Work out the perimeter



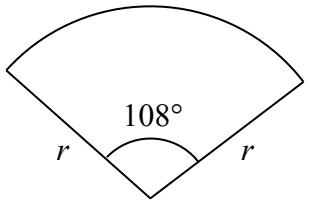
B1 Arc length is 32 mm, find x



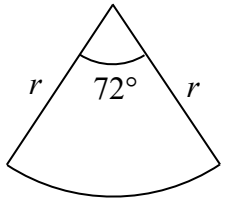
B2 Perimeter is 25 cm, find x



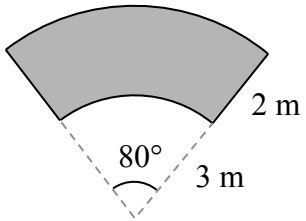
B3 Arc length is 9 cm, find r



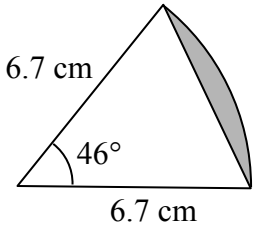
B4 Perimeter is 40 cm, find r



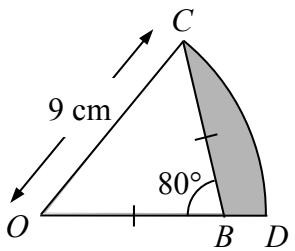
C1 Find the perimeter of the shaded shape.



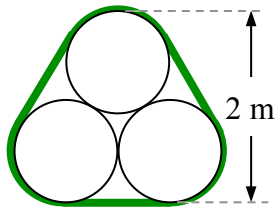
C2 Find the perimeter of the shaded segment.



C3 $OB = BC$. Find the perimeter of the shaded shape.



C4 Find length of the band that goes around the circles.



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REVIEW

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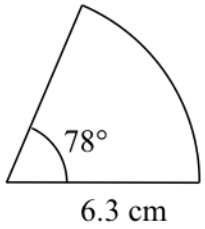
SECTORS

ARC LENGTH AND PERIMETER

Ref: G426. 1R1

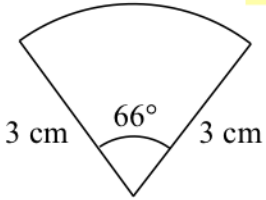
A1 Find the length of the arc

8.58 cm



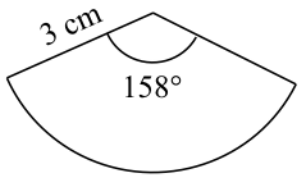
A2 Work out the perimeter

9.46 cm



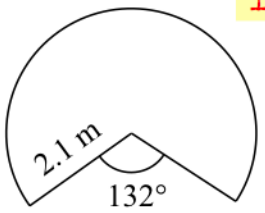
A3 Find the length of the arc

8.27 cm

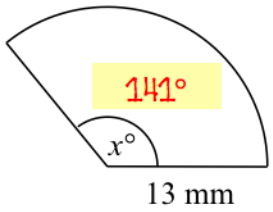


A4 Work out the perimeter

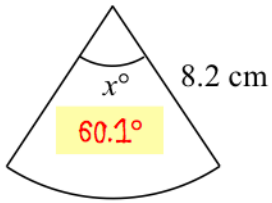
12.6 cm



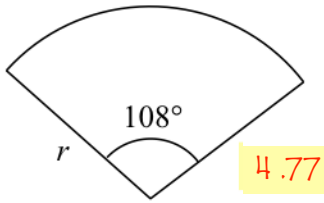
B1 Arc length is 32 mm, find x



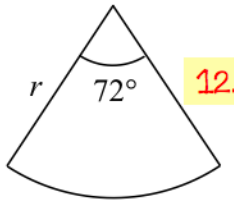
B2 Perimeter is 25 cm, find x



B3 Arc length is 9 cm, find r

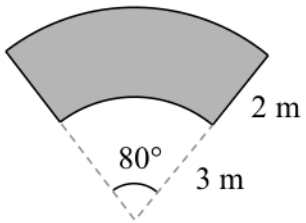


B4 Perimeter is 40 cm, find r



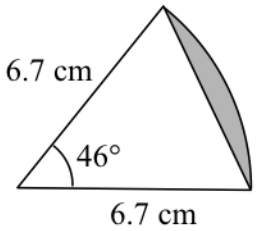
C1 Find the perimeter of the shaded shape.

15.2 cm



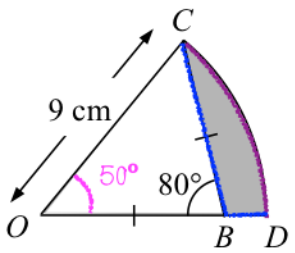
C2 Find the perimeter of the shaded segment.

10 .6 cm

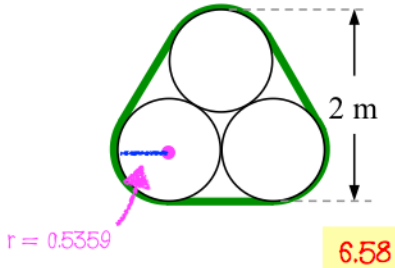


C3 $OB = BC$. Find the perimeter of the shaded shape.

16.9 cm



C4 Find length of the band that goes around the circles.



6.58 cm

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FOUR BY THREE

$\text{ARC} = \frac{\theta}{360} \times 2\pi r$

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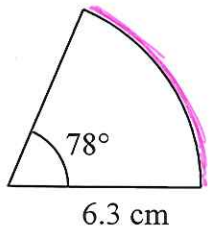
SECTORS

ARC LENGTH AND PERIMETER

Ref: G416. 3C1

Q1 Find the length of the arc

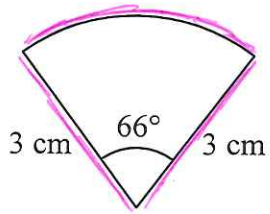


$\text{ARC} = \frac{78}{360} \times 2 \times \pi \times 6.3$

$= 8.5765...$

$= 8.58\text{cm}$

Q2 Work out the perimeter



$\text{ARC} = \frac{66}{360} \times 2\pi \times 3$

$= 3.4557...$

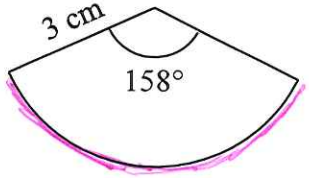
PERIMETER

$3.4557 + 2 \times 3$

$= 9.4557...$

$= 9.46\text{cm}$

Q3 Find the length of the arc

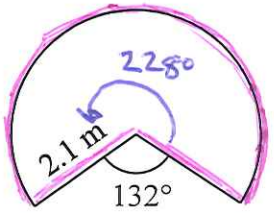


$\text{ARC} = \frac{158}{360} \times 2\pi \times 3$

$= 8.2728...$

$= 8.27\text{cm}$

Q4 Work out the perimeter



$\text{ARC} = \frac{228}{360} \times 2\pi \times 2.1$

$= 8.3566...$

PERIMETER

$8.3566 + 2 \times 2.1$

$= 12.5566$

$= 12.6\text{m}$

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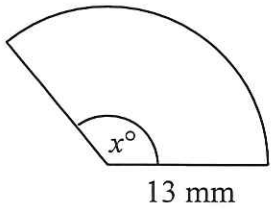
Q5 Arc length is 32 mm, find x



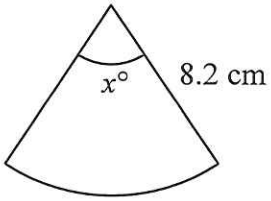
$\frac{x}{360} \times 2\pi \times 13 = 32$

$\Rightarrow x = \frac{360 \times 32}{2\pi \times 13}$

$= 141.035...$

$= 141°$

Q6 Perimeter is 25 cm, find x



$\frac{x}{360} \times 2\pi \times 8.2 + 16.4 = 25$

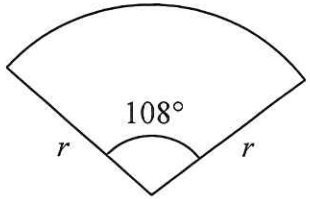
$\Rightarrow \frac{x}{360} \times 2\pi \times 8.2 = 8.6$

$\Rightarrow x = \frac{360 \times 8.6}{2\pi \times 8.2}$

$= 60.090...$

$= 60.1°$

Q7 Arc length is 9 cm, find r

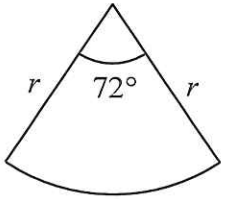


$\frac{180}{360} \times 2\pi r = 9$

$\Rightarrow r = \frac{360 \times 9}{108 \times 2\pi}$

$= 4.77$ cm

Q8 Perimeter is 40 cm, find r



$\frac{72}{360} \times 2\pi r + 2r = 40$

$\Rightarrow 0.4\pi r + 2r = 40$

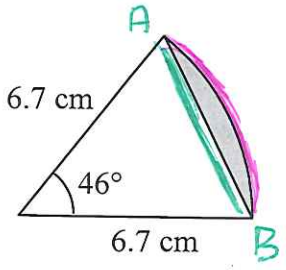
$\Rightarrow (0.4\pi + 2)r = 40$

$\Rightarrow r = \frac{40}{0.4\pi + 2}$

$= 12.282...$

$= 12.3$ cm

Q9 Find the perimeter of the shaded segment



ARC

$\frac{46}{360} \times 2\pi \times 6.7 = 5.3791...$

LENGTH AB

$AB^2 = 6.7^2 + 6.7^2 - 2 \times 6.7 \times 6.7 \cos 46$

$= 27.413...$

$AB = 5.235...$

TOTAL

$5.3791 + 5.235... = 10.6$ cm

ARC

$\frac{50}{360} \times 2\pi \times 9 = 7.8539...$

LENGTH CB

SINCE CB = OB

AND OC = OD = 9

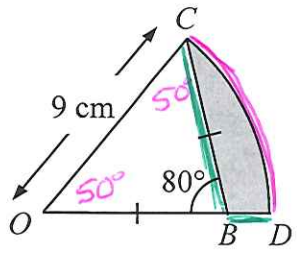
THEN CB + BD = 9 !

TOTAL

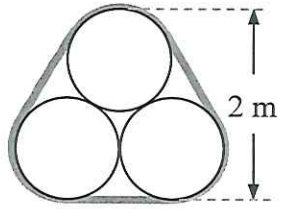
7.8539 + 9 = 16.853...

= 16.9cm

Q11 $OB = BC$. Find the perimeter of the shaded shape.

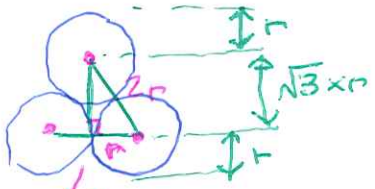


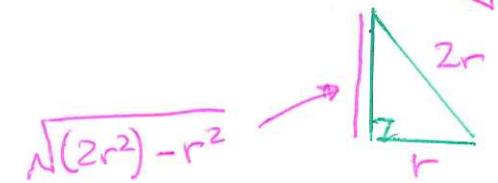
Q12 Find length of the band that goes around the circles.



3.21539 + 3.3671 = 6.58

STEP 1 [RADIUS OF CIRCLES]





$\sqrt{(2r)^2 - r^2}$

$= \sqrt{3r^2}$

$= \sqrt{3} \times r$

$r + \sqrt{3}r + r = 2$

$2r + \sqrt{3}r = 2$

$(2 + \sqrt{3})r = 2$

$r = \frac{2}{2+\sqrt{3}}$

$= 0.5359$

STEP 2

STRAIGHT LENGTHS ARE EACH 2r

∴ TOTAL OF STRAIGHT = 6r

= 3.21539

ARCS

ARE EACH $\frac{120}{360} \times 2\pi \times r$

SO ALL THREE ARE $3 \times \frac{120}{360} \times 2\pi \times 0.5359$

= 3.3671