National 5 Mathematics

Arcs & Sectors - Solutions

Marks are indicated in brackets after each question number

2015 Paper 2 Question 10, (4)

Arc Length $= \frac{angle}{360}\ x\ \pi d$

$28.4 = \frac{64}{360} x\ \pi\ x\ 2r$ since diameter = 2 x radius

$\frac{28.4\ x\ 360}{64\pi} = 2r$

$r = \frac{28.4\ x\ 360}{128\pi}$

$r = 25\ cm$

2016 Paper 1 Question 3, (3)

Area $= \frac{45}{360} x\ \pi\ x\ 20^2$

$= \frac{1}{8}\ x\ 400\ x\ 3.14$

$= 50\ x\ 3.14$

$= \frac{100\ x\ 3.14}{2}$

$= \frac{314}{2}$

$= 157\ cm^2$

2017 Paper 2 Question 14, (3)

Arc length $= \frac{angle}{360}\ x\ \pi\ x\ d$

$31.5 = \frac{AOB}{360}\ x\ \pi\ x\ 12.8$

Rearranging gives

$AOB = \frac{31.5\ x\ 360}{12.8\pi}$

$AOB = 282°$

2018 Paper 2 Question 2, (3)

$$\text{Arc Length} = \frac{320}{360}\ x\ \pi\ x\ 14.8 = 41.3$$
$$= 41.3 \text{ cm}$$

2018 Paper 2 Question 17, (5)

$$\text{Area of Triangle} = \frac{1}{2}(38)(55)\sin 75$$
$$= 1009.39\ cm^2$$

$$\text{Area of Sector} = \frac{75}{360}\ x\ \pi\ x\ 60$$
$$= 39.27\ cm^2$$

$$\text{Shaded Area} = 1009.39 - 39.27$$
$$= 970.12\ cm^2$$

2019 Paper 1 Question 4, (3)

$$\text{Arc Length} = \frac{angle}{360}\ x\ \pi\ x\ d$$
$$= \frac{240}{360}\ x\ 3.14\ x\ 60$$
$$= \frac{2}{3}\ x\ 3.14\ x\ 60$$
$$= 40\ x\ 3.14$$
$$= (40\ x\ 3) + (40\ x\ 0.1) + (40\ x\ 0.04)$$
$$= 120 + 4 + 1.6$$
$$= 125.6\ cm$$

2019 Paper 2 Question 12, (3) (3)

a) $\text{Linear Scale Factor} = \frac{30}{50}$

$\text{Area Scale Factor} = (\frac{30}{50})^2 = 0.36$

$\text{Area} = 2{,}750\ x\ 0.36 = 990\ cm^2$

b) Area $= \frac{angle}{360}\ x\ \pi r^2$

Let the angle $ACB = x$

$2{,}750 = \frac{x}{360} x\ \pi\ x\ 50^2$

$2{,}750 = \frac{2{,}500\pi x}{360}$

$x = \frac{2{,}750\ x\ 360}{2{,}500\pi}$

$x = 126.1°$

2022 Paper 2 Question 10, (3)

Arc Length $= \frac{angle}{360}\ x\ \pi d$

Let the angle be a

$69.4 = \frac{a}{360}\ x\ \pi\ x\ 30$

$69.4 = \frac{30\pi a}{360}$

Rearranging gives

$a = \frac{69.4\ x\ 360}{30\pi}$

$a = 265°$

2023 Paper 2 Question 3, (3)

Arc Length $= \frac{106}{360}\ x\ \pi\ x\ 18.3$

$= 16.93\ m$