National 5 Mathematics

Arcs & Sectors - Solutions

Marks are indicated in brackets after each question number

2015 Paper 2 Question 10, (4)

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

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

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

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

$\qquad r = 25 \ cm$

2016 Paper 1 Question 3, (3)

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

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

$\qquad = 50 \ x \ 3.14$

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

$\qquad = \frac{314}{2}$

$\qquad = 157 \ cm^2$

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)

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

$\qquad\qquad = 41.3$ cm

2018 Paper 2 Question 17, (5)

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

$\qquad\qquad\qquad = 1009.39 \, cm^2$

Area of Sector $= \frac{75}{360} \, x \, \pi \, x \, 60$

$\qquad\qquad\qquad = 39.27 \, cm^2$

Shaded Area $= 1009.39 - 39.27$

$\qquad\qquad\qquad = 970.12 \, cm^2$

2019 Paper 1 Question 4, (3)

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

$\qquad\quad = \frac{240}{360} \, x \, 3.14 \, x \, 60$

$\qquad\quad = \frac{2}{3} \, x \, 3.14 \, x \, 60$

$\qquad\quad = 40 \, x \, 3.14$

$\qquad\quad = (40 \, x \, 3) + (40 \, x \, 0.1) + (40 \, x \, 0.04)$

$\qquad\quad = 120 + 4 + 1.6$

$\qquad\quad = 125.6 \, cm$

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

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

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

$\quad$ 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 $= \frac{106}{360} \; x \; \pi \; x \; 18.3$

$\qquad\qquad = 16.93 \; m$

Question 15, (3)

Arc Length $= \frac{a}{360°} \times \pi d$

$15 = \frac{a}{360°} \times \pi \times 24$

$a = \frac{15 \; \times 360}{24\pi} = 71.6°$

Sector Area $= \frac{a}{360°} \times \pi r^2$

$\qquad\qquad = \frac{71.6}{360°} \times \pi \times 12^2$

$\qquad\qquad = 89.98 \; cm^2$

2025 Paper 2 Question 6, (3)

$$\text{Area} = \frac{170}{360} \times \pi \times 15^2$$

$$= 333.79 \ cm^2$$