

Oxford Revise | AQA GCSE Maths Foundation | Answers

Chapter 21 Circles, cylinders, cones, and spheres

Question	Answer	Extra information	Marks
21.1 (a)	Area = $\pi \times 9 = 28.2743\dots$ Area = 28.3 mm ² , to 3 sf	Correct calculation	1
		9π or 28.2743....	1
		Answer correct to 3 sf	1
21.1 (b)	Circumference = 6π mm = 18.8 mm	Correct calculation	1
		6π or 18.84...	1
		Correct answer to 3 sf	
21.2 (a)	Tangent		1
21.2 (b)	Segment		1
21.3 (a)	Area = $\pi \times 4^2 = 16\pi$ cm ²		1
21.3 (b)	Circumference = 8π cm		1
21.4	Area = 25π , therefore the radius = 5 cm Circumference is then 10π cm	Use $\pi r^2 = 25\pi$ to find the radius	1
		$r = 5$	1
		Correct answer	1
21.5 (a)	Area = $\frac{\pi \times 4.5^2}{2} = 31.8$ cm ²	$\frac{\pi \times 4.5^2}{2}$	1
		Answer correct to 1 dp	1

Question	Answer	Extra information	Marks
21.5 (b)	Perimeter $= \frac{\pi d}{2} + d = \frac{\pi \times 9}{2} + 9 = 23.1 \text{ cm}$	$\frac{\pi d}{2} + d$ Answer correct to 1 dp	1 1
21.6 (a)	Area $= \pi \times 13^2 \times \frac{200}{360} = 295.0 \text{ cm}^2 \text{ (1 dp)}$	Correct formula Answer correct to 1 dp	1 1
21.6 (b)	Arc length $= 2 \times \pi \times 13 \times \frac{200}{360} = 45.4 \text{ cm (1 dp)}$	Correct formula Answer correct to 1 dp	1 1
21.7 (a)	60°		1
21.7 (b)	Area of one sector $= \frac{1}{6} \pi r^2 = \frac{1}{6} \pi \times 18^2 = 54\pi \text{ cm}^2$	$\pi \times 18^2 \times \frac{60}{360}$ to find area of one sector Correct answer (accept 170 cm^2 and 169.6 cm^2)	1 1
21.8 (a)	Volume $= \pi \times 4^2 \times 11 = 176\pi = 552.9 \text{ cm}^3$	$\pi \times 4^2 \times 11$ Correct answer	1 1
21.8 (b)	Curved surface area $= 11 \times 8\pi = 88\pi = 276.5 \text{ cm}^2$	Formula for curved surface area Correct answer	1 1

Question	Answer	Extra information	Marks
21.9	<p>Large semi-circular diameter $= 19.3 + 4.9 = 24.2$ m</p> <p>Perimeter $= \frac{4.9\pi}{2} + \frac{19.3\pi}{2} + \frac{24.2\pi}{2} = 76.0$ m</p>	<p>$\frac{4.9\pi}{2}$ or $\frac{19.3\pi}{2}$ or $\frac{24.2\pi}{2}$</p> <p>Adding perimeters of all three semicircles</p> <p>Correct answer</p>	<p>1</p> <p>1</p> <p>1</p>
21.10 (a)	<p>Volume $= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 18.2^3 = 25252.4$ cm³</p>	<p>Correct formula</p> <p>Correct answer to 1 dp</p>	<p>1</p> <p>1</p>
21.10 (b)	<p>Surface area $= 4\pi r^2 = 4\pi \times 18.2^2 = 4162.5$ cm²</p>	<p>Correct formula</p> <p>Correct answer to 1 dp</p>	<p>1</p> <p>1</p>
21.11	<p>Surface area = $400\pi = 4\pi \times r^2$</p> <p>$100 = r^2$</p> <p>$r = 10$</p> <p>Radius is 10 cm</p>	<p>$4\pi r^2 = 400\pi$ or $r^2 = 100$</p> <p>Correct answer</p>	<p>1</p> <p>1</p>
21.12 (a)	<p>Volume = $\frac{1}{3}\pi \times 10^2 \times 24 = 800\pi$ cm³</p>	<p>$\frac{1}{3}\pi \times 10^2 \times 24$</p> <p>Correct answer</p>	<p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
21.12 (b)	Curved surface area = $\pi \times 10 \times 26 = 260\pi$	$\pi \times 10 \times 26$	1
	Base area = $\pi \times 10^2 = 100\pi$	$\pi \times 10^2$	1
	Total area = $360\pi \text{ cm}^2$	Correct answer	1
21.13	Area of the square base = 230^2	230^2	1
	Volume = $\frac{1}{3} \times 230^2 \times 147 = 2592100$	$\frac{1}{3} \times 230^2 \times 147$	1
	Volume = $2\,600\,000 \text{ m}^3$ (2 sf)	Correct answer	1
21.14	Curved surface area = $21\pi = \pi \times r \times 7$	Use formula for curved surface area	1
	$r = 3$	Attempt to solve equation for r	1
	Area of base = $\pi \times 3^2 = 9\pi = 28.3 \text{ cm}^2$ (1 dp)	Use formula for area of base with your ' r '	1
		Correct answer	1
21.15	Volume of hemisphere		
	$= \frac{2}{3} \pi r^3 = \frac{2}{3} \pi \times 12^3 = 1152\pi$	Attempt to use $\frac{2}{3} \pi r^3$ with $r = 12$	1
	Volume of cylinder		1
	$= \pi r^2 h = \pi \times 12^2 \times 6 = 864\pi$	Attempt to use $\pi r^2 h$ with $r = 12$	1
		Add the two together	1
	Total volume	Correct answer, in terms of π	1
	$= 1152\pi + 864\pi = 2016\pi$		

Question	Answer	Extra information	Marks
21.16	$2x - 3y = 18$ (1) $3x + 4y = -7$ (2)	Attempt to eliminate either x or y	1
	Multiply (1) by 4 and (2) by 3, then add the equations: $8x - 12y = 72$	Correct equation in either x or y	1
	$9x + 12y = -21$ $17x = 51$ $x = 3$	Solve to give $x = 3$ or $y = 4$	1
	Substitute $x = 3$ into either (1) or (2) to get $y = -4$	Correct answer	1
21.17 (a)	$x^2 + 6x + 9 = (x + 3)(x + 3)$		1
21.17 (b)	Side length = $(x + 3)$		1
21.17 (c)	Perimeter = $4(x + 3) = 4x + 12$		1