

fs4u

‘Area, Perimeter
& Volume’

‘How To’ Booklet 39
Answers

Area, Perimeter & Volume

Perimeter

1	a	86
	b	8
	c	28
2	a	46 cm
	b	49.2 cm
	c	17 m

Perimeter/ Circumference of Circle $2\pi r$

a	$2 \times 3.14 \times 13 = 81.64 \text{ cm}$
b	$2 \times 3.14 \times 6 = 37.68 \text{ cm}$
c	$2 \times 3.14 \times 7 = 43.96 \text{ m}$
d	$2 \times 3.14 \times 1.9 = 11.932 \text{ cm}$
e	$2 \times 3.14 \times 65 = 408.2 \text{ m}$

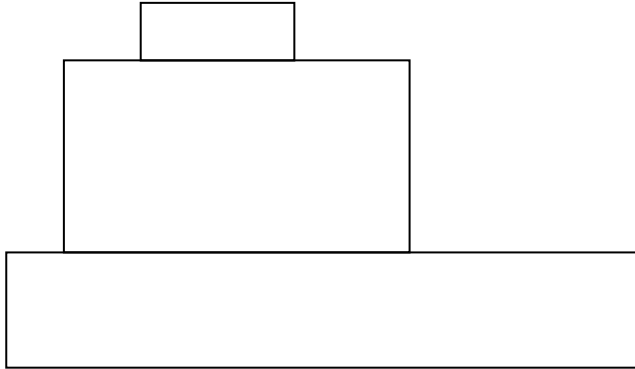
Area

1

a	$6.5 \times 7 = 45.5 \text{ cm}^2$
b	$8.45 \times 8.45 = 71.4025 \text{ cm}^2 \therefore 71.4 \text{ cm}^2$ (to 1 decimal place)
c	$14.75 \times 8.42 = 124.195 \text{ m}^2 \therefore 124.2 \text{ m}^2$ (to 1 decimal place)

Answers (these shapes can, of course be broken down into rectangles other than those shown here)

A Reception Area which is to be carpeted; the dimensions are in metres.



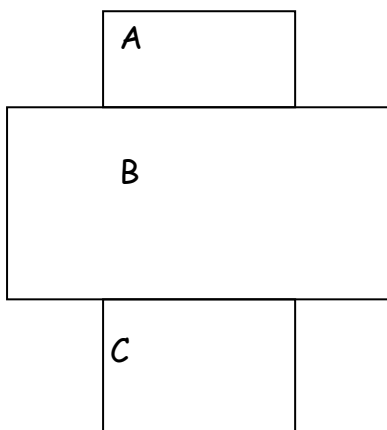
$$\text{Area of A} = 2.2 \times 1.2 = \mathbf{2.64\text{m}^2}$$

$$\text{Area of B} = (1.4 + 2.2 + 2.0) \times 3.2 = 5.6 \times 3.2 = \mathbf{17.92 \text{ m}^2}$$

$$\text{Area of C} = (1.7 + 5.6 + 4) \times 2 = 11.3 \times 2 = \mathbf{22.6 \text{ m}^2}$$

$$\text{Total Area} = 2.64\text{m}^2 + 17.92 \text{ m}^2 + 22.6 \text{ m}^2 = \mathbf{43.16 \text{ m}^2}$$

B A steel plate; measured in centimetres.



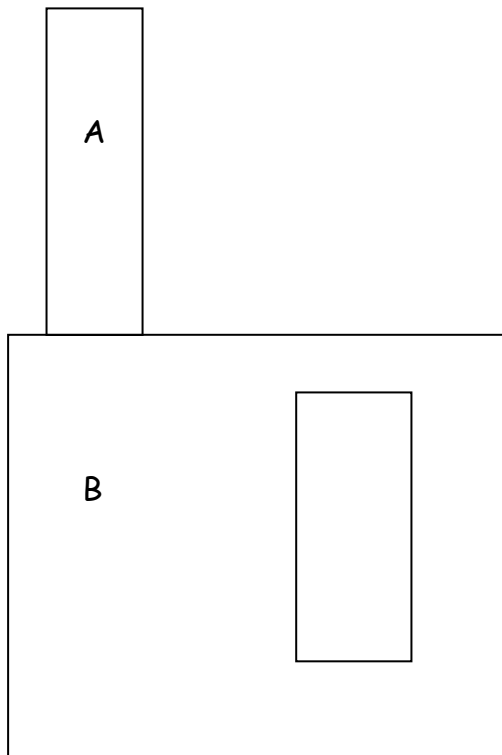
$$\text{Area of A} = 2 \times 7 = \mathbf{14 \text{ cm}^2}$$

$$\text{Area of B} = (3.6 + 7 + 1.5) \times 5.75 = 12.1 \times 5.75 = 69.575 = \mathbf{69.58 \text{ cm}^2}$$

$$\text{Area of C} = 5 \times 7 = \mathbf{35 \text{ cm}^2}$$

$$\text{Area of steelplate} = 14 + 69.58 + 35 = \mathbf{118.58 \text{ cm}^2}$$

C Paths to be gravelled; measured in metres



Area of A = $0.6 \times 5 = 3.0\text{m}^2$

Area of B = $7 \times (1 + 5 + 2) - \text{Area of Pool} = 56 - (1.5 \times 5) = 56 - 7.5 = 48.5 \text{ m}^2$

Area of Paths = $3.0 + 48.5 = 51.5\text{m}^2$

Areas of Circles

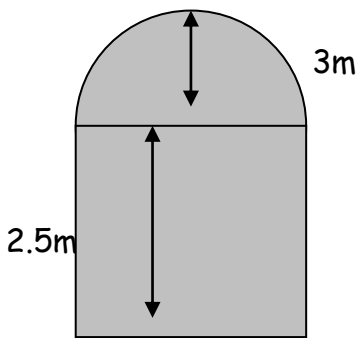
3	a	πr^2 therefore $\pi \times 5^2 = 78.5 \text{ cm}^2$ (to 3s.f.)
	b	581 mm^2
	c	3.8 m^2
	d	9850 mm^2

Volumes

1	a	6.9m^3
	b	37259 mm^3 or 37.26 cm^3
	c	614.13 cm^3

	d	120 ft ³

Cylinder Volumes - $\pi r^2 h$

2	a	$\pi \times 4.15^2 \times 9 = 510 \text{ cm}^3$
	b	$\pi \times 3.8^2 \times 10.9 = 494 \text{ cm}^3$
	c	$\pi \times 65^2 \times 52 = 690000 \text{ mm}^3$
3		A tunnel 30m long has the cross section shown below. What is its volume?
		<p>Volume of the tunnel = Area of cross-section \times length</p> <p>The cross-section is made up of a semi-circle and a rectangle.</p>
Area of semi-circle		Area of rectangle = $6 \times 2.5 = 15 \text{ m}^2$
<p>Total area of cross-section = area of semi-circle + area of rectangle = 29.1 m^2</p> <p>$= \frac{1}{2} \times \pi \times r^2 \quad = \quad \frac{1}{2} \times \pi \times 3^2 \quad = 14.1 \text{ m}^2$</p>		
<p>Volume of tunnel = total area of cross-section \times length</p> <p>$= 29.1 \times 30 = 873 \text{ m}^3$ (to 3 significant figures)</p>		