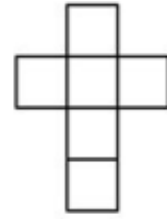


Nets and Surface Area of Cubes and Cuboids

Starter

The net of a 3-D solid is a 2-D representation of the unfolded solid.

The diagram to the right is an example of a net of a cube.



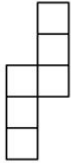
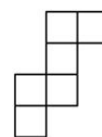
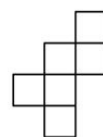
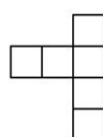
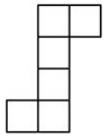
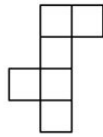
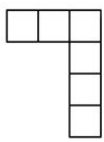
1. Find the surface area of a cube whose sides are 4 cm long

Working: Each face has area = $4 \times 4 = 16$
There are 6 faces so surface area $16 \times 6 = 96 \text{ cm}^2$.

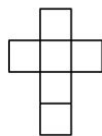
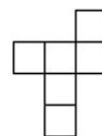
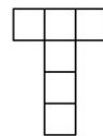
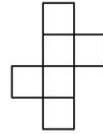
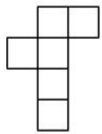
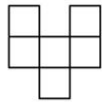
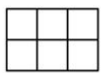
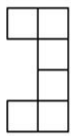
Do not draw the diagrams

2. Working in pairs, decide which of the following nets could fold up into a cube.

(a) (b) (c) (d) (e) (f) (g) (h)



(i) (j) (k) (l) (m) (n) (o) (p)



Working: (a) N (b) Y (c) Y (d) N (e) N (f) Y (g) Y (h) Y
(i) N (j) N (k) N (l) Y (m) Y (n) Y (o) Y (p) Y

- E.g. 1** Find the surface area of cuboid whose dimensions are 2 cm by 3 cm by 5 cm.

Working: There are 2 faces that are 2 cm by 3 cm: Area = $2 \times 2 \times 3 = 12$
There are 2 faces that are 3 cm by 5 cm: Area = $2 \times 3 \times 5 = 30$
There are 2 faces that are 5 cm by 2 cm: Area = $2 \times 5 \times 2 = 20$
Surface area = $12 + 30 + 20 = 62 \text{ cm}^2$.

or use the formula

$$\text{Surface area} = 2(2 \times 3 + 3 \times 5 + 5 \times 2) = 62 \text{ cm}^2.$$

- E.g. 2** Find the surface area of cuboid whose dimensions are 5 cm by 11 cm by 16 cm.

Working: There are 2 faces that are 5 cm by 11 cm: Area = $2 \times 5 \times 11 = 110$
There are 2 faces that are 11 cm by 16 cm: Area = $2 \times 11 \times 16 = 352$
There are 2 faces that are 16 cm by 5 cm: Area = $2 \times 16 \times 5 = 160$
Surface area = $110 + 352 + 160 = 622 \text{ cm}^2$.

or use the formula

$$\text{Surface area} = 2(5 \times 11 + 11 \times 16 + 16 \times 5) = 622 \text{ cm}^2.$$

E.g. 3 Two dimensions of a cuboid are 3 cm and 8 cm. Given that the surface area of the cuboid is 202 cm². Find the length of the 3rd side.

Working: Let the length of the 3rd side be x .
The sides are then 3, 8 and x .
There are 2 faces that are 3 cm by 8 cm: Area = $2 \times 3 \times 8 = 48$
There are 2 faces that are 8 cm by x cm: Area = $2 \times 8 \times x = 16x$
There are 2 faces that are x cm by 3 cm: Area = $2 \times x \times 3 = 6x$
Surface area: $48 + 16x + 6x = 202$
Collect like terms: $22x = 154$
Divide by 22: $x = \frac{154}{22} = 7$ cm
The 3rd side is 7 cm.
or use the formula
Surface area: $2(3 \times 8 + 8 \times x + x \times 3) = 202$
Simplify: $2(24 + 8x + 3x) = 202$
Collect like terms: $2(24 + 11x) = 202$
Expand the brackets: $48 + 22x = 202$
Collect like terms: $22x = 154$
Divide by 22: $x = \frac{154}{22} = 7$ cm
The length of the 3rd side is 7 cm

E.g. 4 A cube has surface area 253.5 cm². Calculate its dimensions.

Working: Let the side length of the cube be x .
Each face has area = $x \times x = x^2$
There are 6 faces so the surface area = $6 \times x^2 = 6x^2$
The surface area is 253.5: $6x^2 = 253.5$
Divide by 6: $x^2 = 42.25$
 $x = \sqrt{42.25} = 6.5$
The dimensions of the cube are 6.5 cm by 6.5 cm by 6.5 cm.

Video: [Nets](#)
Video: [Surface area of a cuboid](#)
Video: [Surface area of L-shaped prism](#)

[Solutions to Starter and E.g.s](#)

Exercise

p109 Ex 6.4 Qu 1-3, 6-11

[Textbook answers \(only available during a lockdown\)](#)