

1 Faces, edges and vertices

A prism has ends with n sides.

- Show that faces + vertices - edges = 2 for the prism.
- A pyramid with an n sided base is glued onto one end. Find the faces, edges and vertices of the new solid in terms of n .

$$a) (n + 2) + 2n - 3n = 2$$

$$b) \text{ faces } (n + 2) + (n + 1) - 2$$

$$2n + 1 \text{ faces, } 4n \text{ edges, } 2n + 1 \text{ vertices}$$

2 Plans and elevations

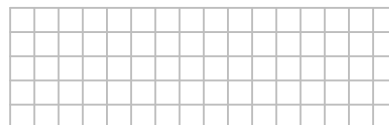
The plan shows the number of cubes in each stack. On the grid:

- Draw the front elevation.
- Draw the side elevation, looking from the right.

2	3	1
1	2	
3	1	1

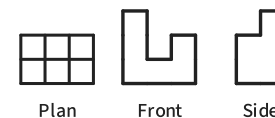
Side

Front



3 Plans and elevations: the solid

These are the plan and two elevations of a solid made of cubes.



- What is the greatest number of cubes it could have?

- What is the least number?

a) each stack as tall as both views allow

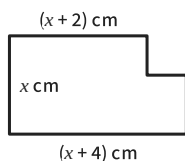
$$3 + 1 + 2 + 2 + 1 + 2 = 11$$

b) one stack of 3, one of 2, the rest 1: 9

4 Perimeter of compound shapes

A 2 cm square is cut from a corner of a rectangle. The area left is 41 cm^2 .

- Show that $x^2 + 4x - 45 = 0$.
- Work out the perimeter of the shape.



Not drawn accurately

$$a) x(x + 4) - 2 \times 2 = 41$$

$$b) (x + 9)(x - 5) = 0, x = 5$$

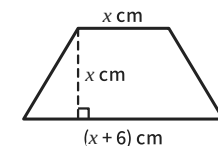
$$2 \times (9 + 5) = 28 \text{ cm}$$

Area and volume 1 revision mat answers

5 Area of 2D shapes

This isosceles trapezium has an area of 40 cm^2 .

- Find x .
- Work out its perimeter to 1 decimal place.



Not drawn accurately

$$a) (2x + 6) \div 2 \times x = 40, x^2 + 3x - 40 = 0$$

$$(x + 8)(x - 5) = 0, x = 5$$

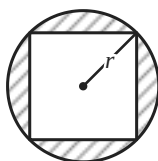
$$b) \text{ slant side } \sqrt{3^2 + 5^2} = 5.831$$

$$5 + 11 + 2 \times 5.831 = 27.7 \text{ cm}$$

6 Circumference and area of a circle

The corners of the square are on the circle. The circle has radius r .

- Show that the shaded area is $r^2(\pi - 2)$.
- Work out the shaded area when $r = 5 \text{ cm}$, to 3 significant figures.



$$a) \text{ square: two triangles } \frac{1}{2} \times 2r \times r = 2r^2$$

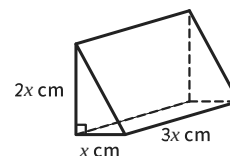
$$\pi r^2 - 2r^2 = r^2(\pi - 2)$$

$$b) 25(\pi - 2) = 28.5 \text{ cm}^2$$

7 Volume of prisms

The cross section of this prism is a right angled triangle. Its volume is 375 cm^3 .

- Find x .
- It is melted and recast as a cube. Find the side of the cube to 3 significant figures.



Not drawn accurately

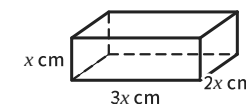
$$a) \frac{1}{2} \times x \times 2x \times 3x = 3x^3 = 375, x = 5$$

$$b) \text{ cube root of } 375 = 7.21 \text{ cm}$$

8 Surface area of cuboids

This cuboid has a surface area of 352 cm^2 .

- Work out its volume.
- It is cut in half, parallel to its smallest face. How much does the total surface area go up by?



$$a) 2(2x^2 + 3x^2 + 6x^2) = 22x^2 = 352, x = 4$$

$$4 \times 8 \times 12 = 384 \text{ cm}^3$$

$$b) \text{ two new 4 by 8 faces: } 64 \text{ cm}^2$$