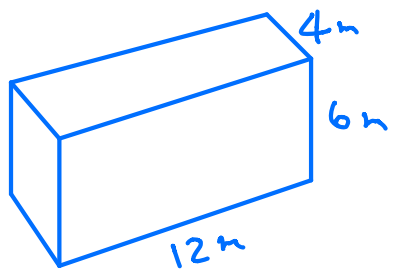
Costings Related to Area and Volume

Ex1



A cuboid container measures 12m by 6m by 4m

It is to be filled with sand costing £5.75 per cubic metre

How much will this cost?

Volume $= 12 \times 6 \times 4 = 288\,m^3$

Cost $= 288 \times £5.75 = £1656$

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2) Same container has outside painted

A £3.25 tin of paint will cover an area of $4m^2$. Find the cost of the paint required

Surface Area

$2 \times 12 \times 6 = 144$

$2 \times 12 \times 4 = 96$

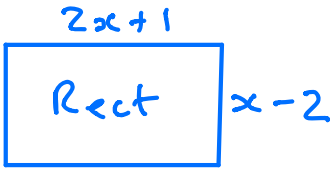
$2 \times 6 \times 4 = 48$

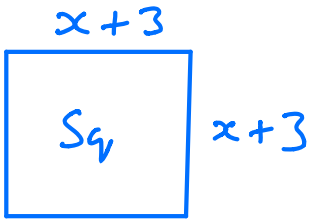
Total $288\,m^2$

$\frac{288}{4} = 72$ tins required

$72 \times £3.25 = £234$

Linking Algebra to Perimeter and Area





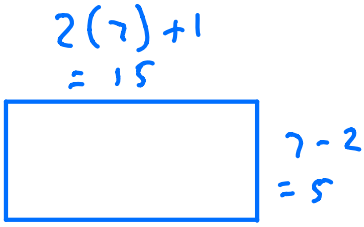
Rectangle and Square have same perimeter
Find area of each

Rect Perimeter $= 2(2x+1) + 2(x-2)$
$= 4x+2 + 2x-4 \quad = 6x-2$

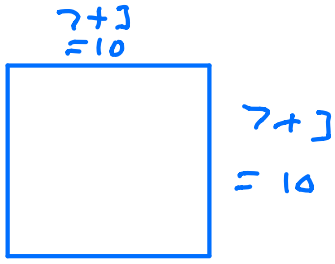
Square Perimeter $= 4(x+3) = 4x+12$

Perimeters Equal so

$6x - 2 = 4x + 12$
$6x - 4x = 12 + 2$
$2x = 14$
$x = 7$

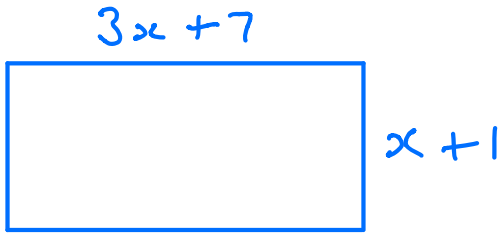


Area
15×5
$= 75\ cm^2$



Area $= 10 \times 10$
$= 100\ cm^2$

2)



Perimeter = 80 cm

Find area

$2(3x+7) + 2(x+1) = 80$

$6x + 14 + 2x + 2 = 80$

$8x + 16 = 80$

$8x = 80 - 16$

$8x = 64$

$x = \frac{64}{8}$

$x = 8\text{ cm}$

Length $= 3(8) + 7 = 31\text{ cm}$

Width $= 8 + 1 = 9\text{ cm}$

Area $= 31 \times 9$

279 cm^2

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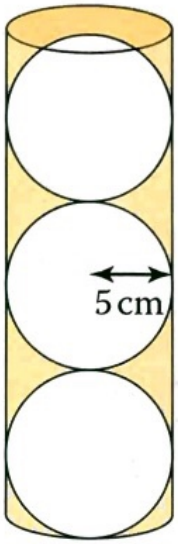
7 Rachel bought a cylindrical tube containing three power balls.
Each ball is a sphere of radius 5 cm.
The balls touch the sides of the tube.
The balls touch the top and bottom of the tube.

Work out the volume of empty space in the tube.



Sphere

$V = \frac{4}{3}\pi r^3$

Cylinder

$V = \pi r^2 h$

8 **a** Which has the greater volume, a sphere with diameter 3 cm or a cube with side length 3 cm?

b Which has the greater surface area, a sphere with diameter 3 cm or a cube with side length 3 cm?

7) Cylinder Vol $= \pi r^2 h$

$= \pi \times 5^2 \times 30$

$= 750\pi$

3 Spheres Vol $= 3 \times \frac{4}{3}\pi r^3$

$= 3 \times \frac{4}{3}\pi \times 5^3$

$= 600\pi$

Empty Space $= 750\pi - 600\pi$

$= 150\pi$

$= 471 \text{ cm}^3$

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8) a) Cube Vol $= 3 \times 3 \times 3 = 27 \text{ cm}^3$

Sphere Vol $= \frac{4}{3} \times \pi \times 1.5^3 = 14.1 \text{ cm}^3$

b) Cube surface area $6 \times 3 \times 3 = \underline{54 \text{ cm}^2}$

Sphere surface area $= 4\pi r^2$

$= 4\pi \times 1.5^2$

$= \underline{28.3 \text{ cm}^2}$

cube has larger surface area.