

# PROBLEM 6

Calculate 1.5% of £400

Increase £2500 by 2.5%

Round £15260.98 correct to the nearest £

Bella invests £25000 in a savings account for three years. The account pays 2.5% compound interest per annum.

Bella has to pay 20% tax on the interest earned each year. This tax is taken from her account at the end of each year.

How much money will Bella have in her account at the end of the three years?

Give your answer to the nearest pound

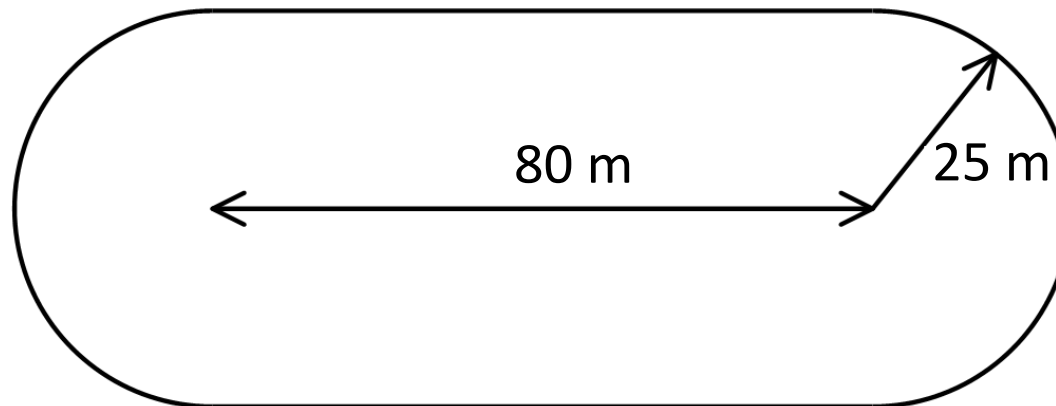
# PROBLEM 7

Calculate the circumference of a circle with radius 20 m

Convert 2120 mm to metres

Calculate the circumference of a circle with diameter 40 m

The race track above is made of a rectangle and two semi-circles. A standard bike wheel has a diameter of 620mm. Calculate how many complete revolutions a bike wheel will make when completing 5 laps of the track.

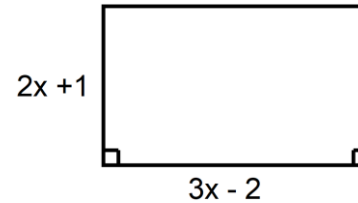


# PROBLEM 8

Factorise

$$x^2 - 7x + 12$$

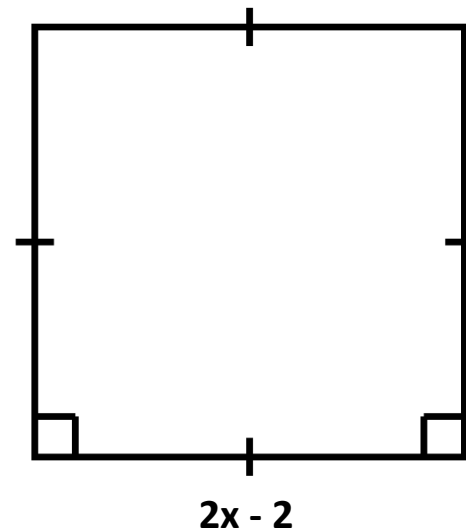
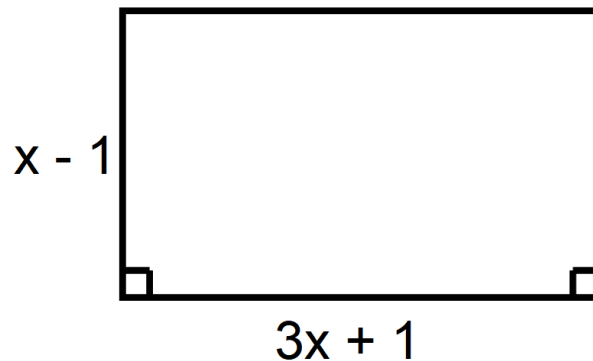
Write an expression for the area of the rectangle



Expand and simplify  $(3x + 2)^2$

The square has the same area as the rectangle.

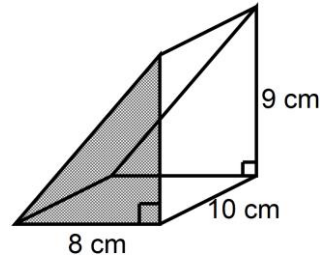
Calculate the perimeter of the square.



# PROBLEM 9

Write down the upper and lower bounds of a box of sweets weighing 350g correct to the nearest 10g

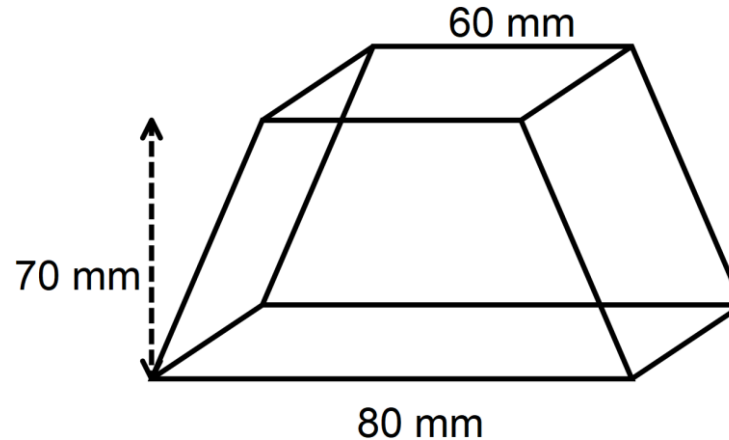
Calculate the volume



A block with volume of  $18 \text{ cm}^3$  is made from an alloy with density  $2.5 \text{ g/cm}^3$ . Calculate the mass of the block

The metal used to make the model shown below has a density of  $4 \text{ g/cm}^3$ .

The measurements are all given correct to the nearest 10mm.

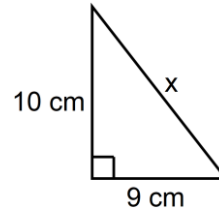


Find the upper and lower bounds for the mass of the model.

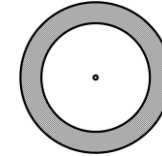
# PROBLEM 10

Calculate the area of a circle with a diameter of 12 cm

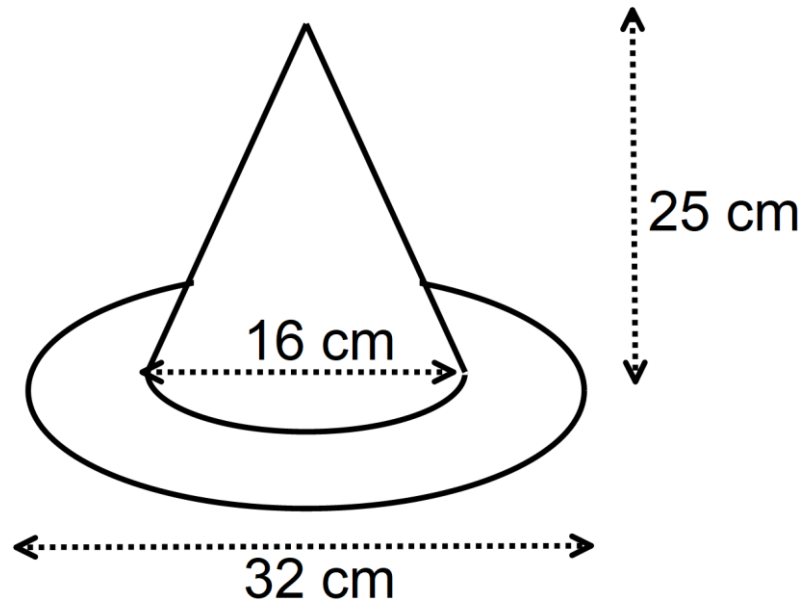
Calculate  $x$



The circles have radii 10 cm and 8 cm. Calculate the shaded area.



Calculate the area of material needed to fully cover the hat shown below inside and outside. (Curved surface area of a cone =  $\pi r l$ )



# PROBLEM 6

Calculate 1.5% of £400

$$1.5\% = 0.015$$

$$0.015 \times 400 = \text{£}6.00$$

Increase £2500 by 2.5%

$$2.5\% = 0.025$$

$$1.025 \times 2500 = \text{£}5262.50$$

Round £15260.98 correct to the nearest £

$$15261$$

Bella invests £25000 in a savings account for three years. The account pays 2.5% compound interest per annum.

Bella has to pay 20% tax on the interest earned each year. This tax is taken from her account at the end of each year.

How much money will Bella have in her account at the end of the three years?

Give your answer to the nearest pound

$$\text{Year 1: Interest } \text{£}25000 \times 0.025 = \text{£}625 - 20\% = \text{£}500$$

$$\text{Year 2 : } 25500 \times 0.025 = \text{£}637.50 - 20\% = \text{£}510$$

$$\text{Year 3 : } 26010 \times 0.025 = \text{£}650.25 - 20\% = \text{£}520.20$$

$$\text{Total} = \text{£}26530$$

# PROBLEM 7

Calculate the circumference of a circle with radius 20 m

$$C = 2 \times \pi \times 20 \\ = 125.66 \text{ m}$$

Convert 2120 mm to metres

$$2120 \text{ mm} = 212 \text{ cm} \\ 212 \text{ cm} = 2.12 \text{ m}$$

Calculate the circumference of a circle with diameter 40 m

$$C = \pi \times 40 \\ = 125.66 \text{ m}$$

The race track above is made of a rectangle and two semi-circles. A standard bike wheel has a diameter of 620mm. Calculate how many complete revolutions a bike wheel will make when completing 5 laps of the track.

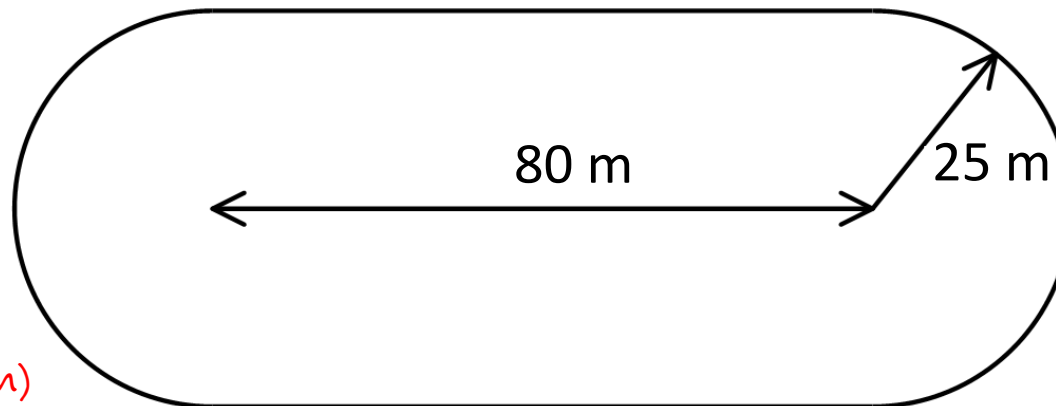
Curved track length

$$= \pi \times 50$$

Total Track length

$$= 50\pi + 160$$

$$(317.08 \text{ m})$$



Circumference of the wheel

$$= \pi \times 0.62$$

$$= 0.62\pi \quad (1.948 \text{ m})$$

$$\text{Number of revolutions} = \frac{50\pi + 160}{0.62\pi} = 162 \text{ (complete revolutions)}$$

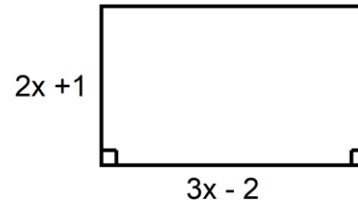
# PROBLEM 8

Factorise

$$x^2 - 7x + 12$$

$$(x - 3)(x - 4)$$

Write an expression for the area of the rectangle



Area  $(2x+1)(3x-2)$

Expand and simplify  $(3x + 2)^2$

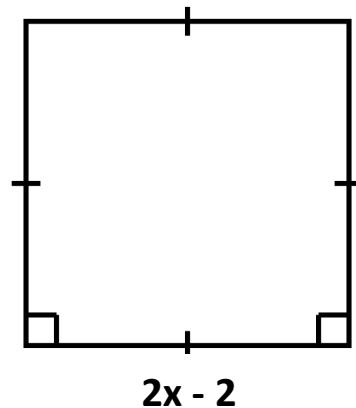
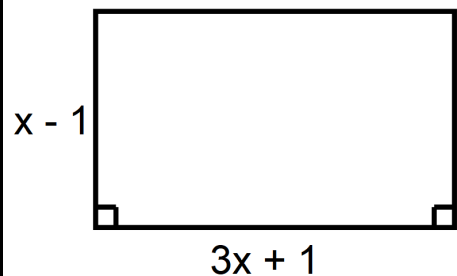
$$(3x + 2)(3x + 2)$$

$$9x^2 + 6x + 6x + 4$$

$$9x^2 + 12x + 4$$

The square has the same area as the rectangle.

Calculate the perimeter of the square.



$$(2x - 2)^2 = (3x + 1)(x - 1)$$

$$4x^2 - 8x + 4 = 3x^2 - 2x - 1$$

$$x^2 - 6x + 5 = 0$$

$$(x - 5)(x + 1) = 0$$

$$x = 5 \quad x = -1(\text{not possible})$$

$$\text{Perimeter of the square} = 4 \times (2 \times 5 - 2) = 32 \text{ cm}$$

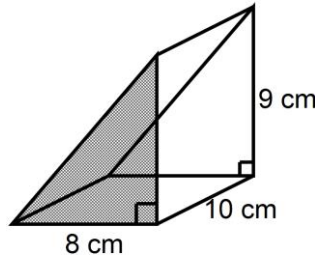


# PROBLEM 9

Write down the upper and lower bounds of a box of sweets weighing 350g correct to the nearest 10g

$$LB = 345g \quad UB = 355g$$

Calculate the volume



$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 8 \times 9 \\ &= 36 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Volume} &= 36 \times 10 \\ &= 360 \text{ cm}^3 \end{aligned}$$

A block with volume of  $18 \text{ cm}^3$  is made from an alloy with density  $2.5 \text{ g/cm}^3$ . Calculate the mass of the block

$$18 \times 2.5 = 45 \text{ g}$$

The metal used to make the model shown below has a density of  $4 \text{ g/cm}^3$ .

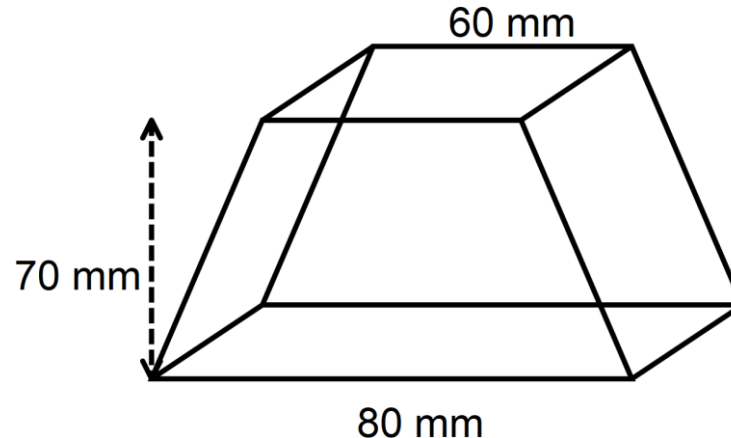
The measurements are all given correct to the nearest 10mm.

Upper bound for Volume

$$\frac{1}{2} (85+65) \times 75 = 5625 \text{ mm}^3$$

Lower bound for Volume

$$\frac{1}{2} (75+55) \times 65 = 4225 \text{ mm}^3$$



$$5625 \text{ mm}^3 = 5.625 \text{ cm}^3$$

$$4225 \text{ mm}^3 = 4.225 \text{ cm}^3$$

$$LB \text{ Mass} = 4.225 \times 4 = 16.9 \text{ g}$$

$$UB \text{ Mass} = 5.625 \times 4 = 22.5 \text{ g}$$

Find the upper and lower bounds for the mass of the model

# PROBLEM 10

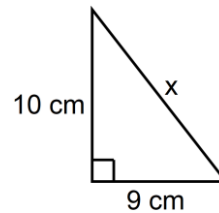
Calculate the area of a circle with a diameter of 12 cm

$$\text{Diameter} = 12 \text{ cm}$$

$$\text{Radius} = 6 \text{ cm}$$

$$\text{Area} = \pi \times 6^2 = 113.10 \text{ cm}^2$$

Calculate x

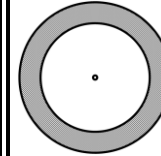


$$x^2 = 10^2 + 9^2$$

$$x = \sqrt{181}$$

$$x = 13.45 \text{ cm}$$

The circles have radii 10 cm and 8 cm. Calculate the shaded area.



$$\pi \times 10^2 - \pi \times 8^2$$

$$= 36\pi$$

$$= 113.10 \text{ cm}^2$$

Calculate the area of material needed to fully cover the hat shown below inside and outside. (Curved surface area of a cone =  $\pi r l$ )

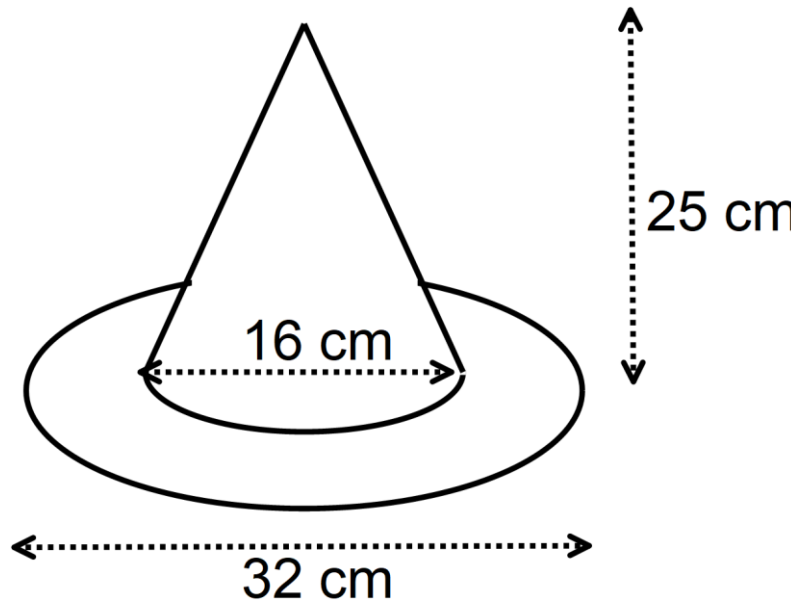
Slant height of cone

$$x^2 = 25^2 + 8^2$$

$$x = \sqrt{689}$$

Surface area of the cone

$$\pi \times 8 \times \sqrt{689} = 659.70$$



Area of rim of the hat

$$\pi \times 16^2 - \pi \times 8^2$$

$$= 192\pi$$

$$= 603.19 \text{ cm}^2$$

Total surface area =

$$2 \times (659.70 + 603.19)$$

$$= 2525.78 \text{ cm}^2$$