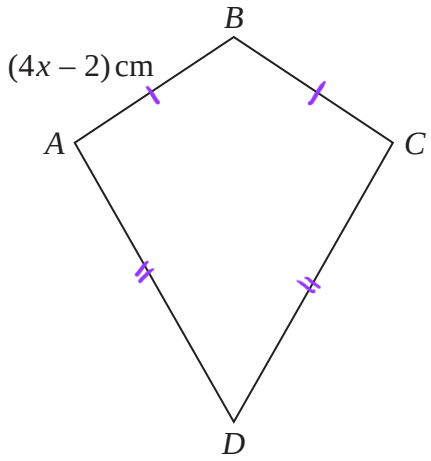
1 *ABCD* is a kite.



Based on what we know about the properties of a kite:

AB = BC

AD = CD

$AB = (4x - 2)$ cm

Jasper says that x could be 0.5

(a) Explain why Jasper cannot be correct.

AB = (4(0.5) - 2) cm = 2 - 2 = 0 cm

Length of AB cannot be 0. (1)

substitute the value of x into the equation

(1)

$AD = 3AB$

The kite has a perimeter of 64 cm.

(b) Find the value of x.

AD = 3(4x - 2)

= 12x - 6 (1)

Perimeter = AB + BC + CD + AD

= 2AB + 2AD (because AB = BC and CD = AD)

64 = 2(4x - 2) + 2(12x - 6) (1)

64 = 8x - 4 + 24x - 12

64 = 32x - 16

80 = 32x

$x = \frac{80}{32} = 2.5$ (1)

$x =$ 2.5

(3)

(Total for Question 1 is 4 marks)

2 Jenna measures all the angles around a point.

Her results are 23°, 145°, 23° and 69°

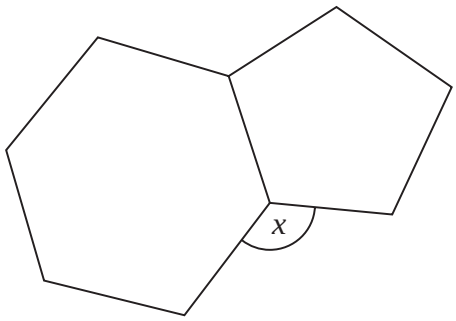
Explain why these results cannot be true.

The total angle does not add up to 360°. (1)

Total angle of a complete circle is always 360°.

(Total for Question 2 is 1 mark)

3 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.
You must show all your working.

Interior angle = $\frac{180}{n} \times (n-2)$, n = number of sides

For hexagon, $n=6$

Interior angle = $\frac{180}{6} \times (6-2)$

$= 30 \times 4$

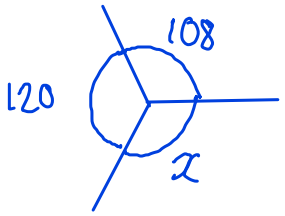
$= 120$ (1)

For pentagon, $n=5$

Interior angle = $\frac{180}{5} \times (5-2)$

$= 36 \times 3$

$= 108$



All add to 360, so

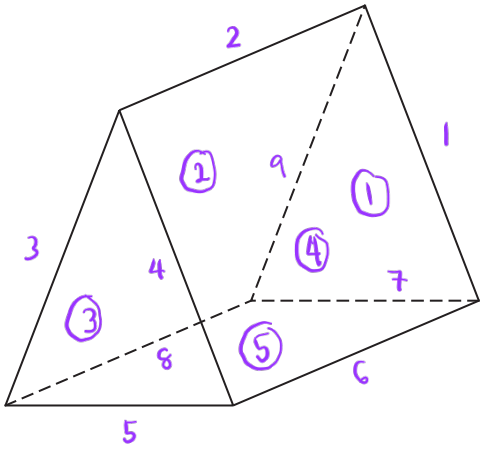
$x = 360 - (120 + 108)$ (1)

$= 132$ (1)

132 °

(Total for Question 3 is 3 marks)

4 The diagram shows a solid triangular prism.



(a) Write down the number of faces of the prism.

5

(1)

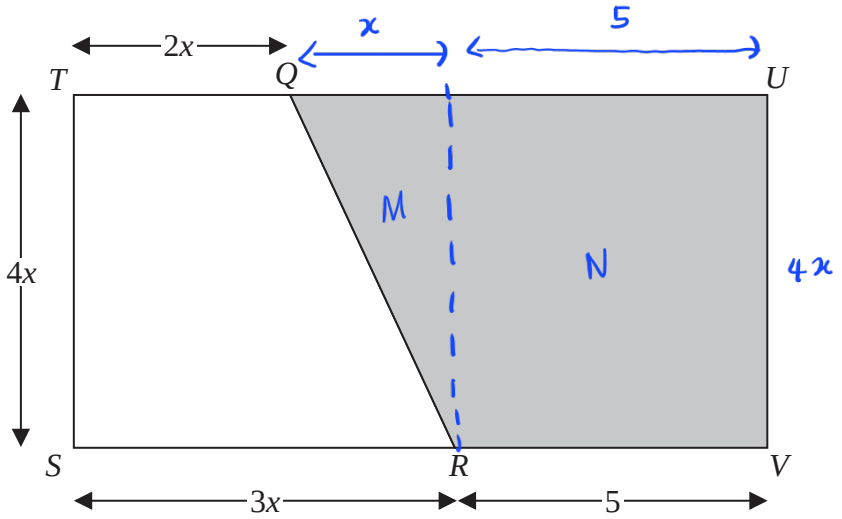
(b) Write down the number of edges of the prism.

9

(1)

(Total for Question 4 is 2 marks)

5 The diagram shows rectangle *STUV*.
TQU and *SRV* are straight lines.
All measurements are in cm.



The area of trapezium *QUVR* is A cm^2

Show that $A = 2x^2 + 20x$

Area of triangle = $\frac{1}{2} \times l \times h$

Area of triangle M : $\frac{1}{2} \times x \times 4x$

$= 2x^2$ (1)

Area of square N : $5 \times 4x$

$= 20x$

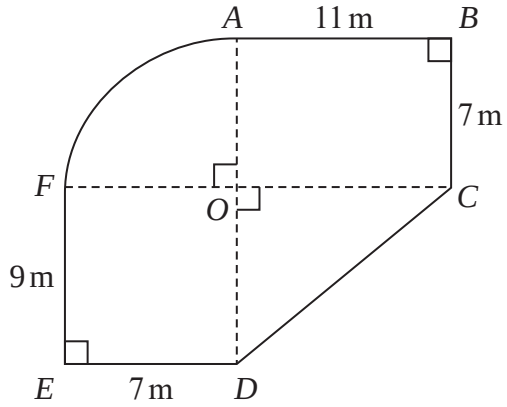
Area of trapezium QUVR = Area of M + area of N (1)

$A = 2x^2 + 20x$ (1)

(Total for Question 5 is 3 marks)

6 The diagram shows a plan of Jason's garden.

ABCO and *DEFO* are rectangles.
CDO is a right-angled triangle.
AFO is a sector of a circle with centre *O* and angle *AOF* = 90°



Jason is going to cover his garden with grass seed.
Each bag of grass seed covers 14 m² of garden.
Each bag of grass seed costs £10.95

Work out how much it will cost Jason to buy all the bags of grass seed he needs.

Finding the area of all sections :

Area of ABCO = 11 m × 7 m = 77 m^2

Area of DEFO = 9 m × 7 m = 63 m^2

Area of AOF = $\frac{1}{4} \times \pi \times (7\text{ m})^2 = 38.4845\ m^2$

Area of COD = $\frac{1}{2} \times 11\text{ m} \times 9\text{ m} = 49.5\ m^2$ (1)

finding total area of all sections :

77 + 63 + 49.5 + 38.4845 = 227.9845 m^2 (1)

Finding total bags of grass to cover his garden.

$\frac{227.9845\ m^2}{14\ m^2} = 16.28$ (1)

∴ He needs to buy 17 bags of grass (round up)

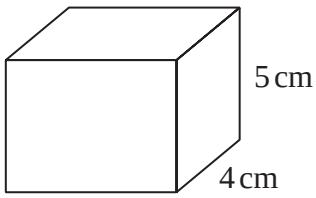
Finding total cost :

17 × £10.95 = £186.15 (1)

£ 186.15 (1)

(Total for Question 6 is 5 marks)

7 Here is a cuboid.



Work out the volume of the cuboid.

Volume of cuboid = length x width x height

Volume = 8 x 5 x 4 (1)

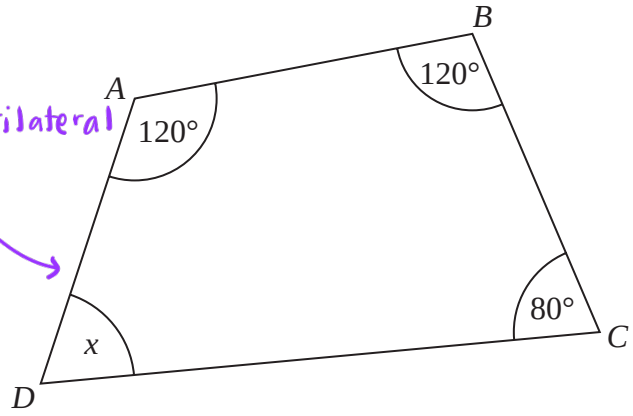
= 160 cm^3

160 (1)

..... cm^3

(Total for Question 7 is 2 marks)

8 *ABCD* is a quadrilateral.



Angles of a quadrilateral add up to 360°

(a) (i) Work out the size of angle *x*.

$x = 360° - 120° - 120° - 80°$

$= 40°$

40 (1) °

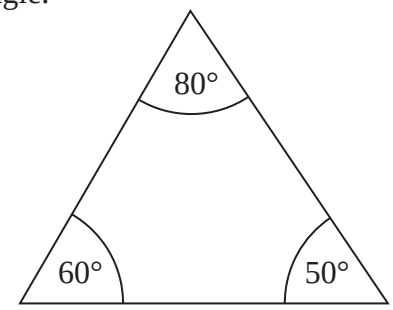
(1)

(ii) Give a reason for your answer.

Angles in a quadrilateral adds up to 360°. (1)

(1)

The diagram below shows a triangle.



The diagram is wrong.

(b) Explain why.

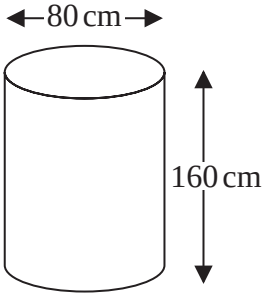
Total angle = 80° + 60° + 50° = 190°.

Angle in a triangle only adds up to 180°. (1)

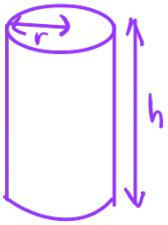
(1)

(Total for Question 8 is 3 marks)

9 Karina has 4 tanks on her tractor.
Each tank is a cylinder with diameter 80 cm and height 160 cm.



Volume of cylinder : $\pi \times r^2 \times h$



The 4 tanks are to be filled completely with a mixture of fertiliser and water.

The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.
Karina has 32 litres of fertiliser.

1 litre = 1000 cm^3

Has Karina enough fertiliser for the 4 tanks?
You must show how you get your answer.

Finding volume of a tank :

$\pi \times r^2 \times h = \pi \times 40^2 \times 160 = 256\,000\,\pi$ (1)

Finding volume of 4 tanks :

$4 \times 256\,000\,\pi = 1\,024\,000\,\pi$ (1)

Finding the amount of mixture for 1 tank :

$$\frac{256\,000\,\pi}{(100+1)} = \frac{256\,000\,\pi}{101} = 7962.8\ cm^3$$

4 tanks : $7962.8 \times 4 = 31851.4\ cm^3$ (1)

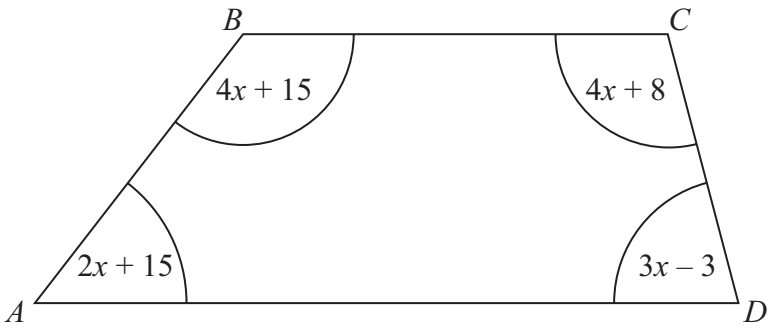
Fertiliser Karina has :

$32 \times 1000\ cm^3 = 32000\ cm^3$

Yes. Karina has $32000\ cm^3$ to fill in $31851.4\ cm^3$ of tank. (1)

(Total for Question 9 is 4 marks)

10 *ABCD* is a quadrilateral.



All angles are measured in degrees.

Show that *ABCD* is a trapezium.

Total angle = 360°

$(2x + 15) + (4x + 15) + (4x + 8) + (3x - 3) = 360°$ (1)

$13x + 35 = 360°$

$13x = 325°$ (1)

$x = 25°$ (1)

∴ C+D should be equal to 180° since co-interior angles sum up to 180°

$4x + 8 + 3x - 3 : 4(25) + 8 + 3(25) - 3$

$= 100 + 8 + 75 - 3$

$= 180°$ (1) (shown)

∴ since C+D = 180°, BC and AD are parallel which is why ABCD is a trapezium.

(Total for Question 10 is 4 marks)