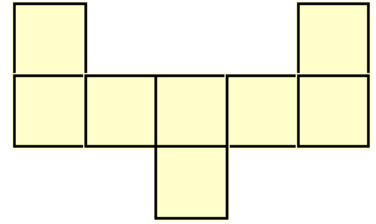# Strathaven Academy

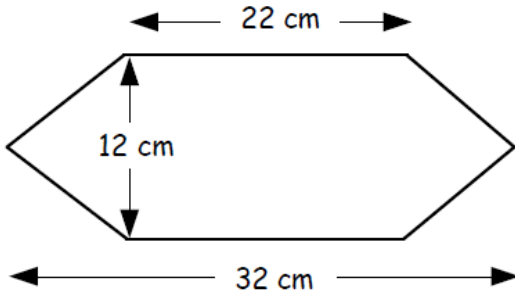# Level 3 – Unit 4

Homework

- Scale Drawing
- Money
- 3D Objects
- Volume

Scale Drawing

1. Draw a neat **2 times** enlargement of this shape.

   Each box is a 1 centimetre square.
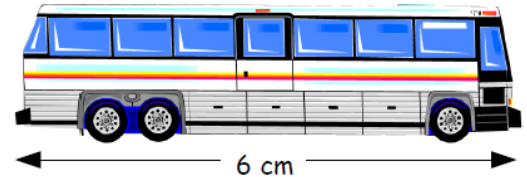
2.
   22 cm

   12 cm

   32 cm

   This shape is not drawn to scale.

   Make an accurate drawing of the shape with **one quarter** of its given dimensions.
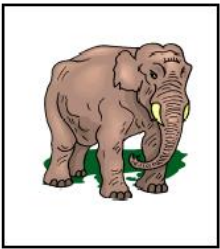
3. The coach has been drawn to a scale of :-

   1 cm represents 2·5 metres.

   Find the length of the **real** coach.
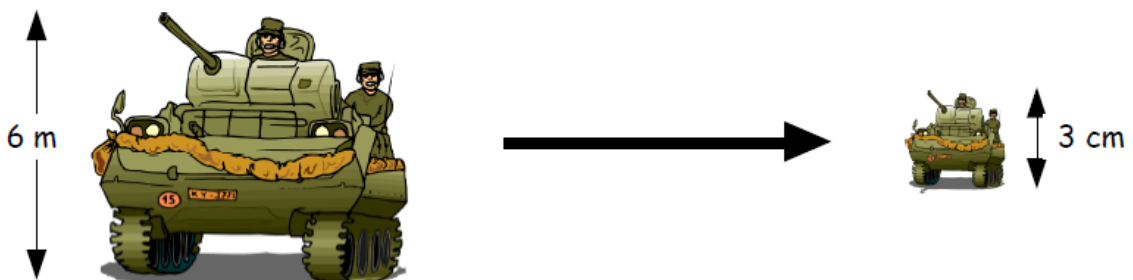
   6 cm

4. The elephant in the stamp is $\frac{1}{60}$ of its real life size.

   If the elephant is 3 metres tall, what will the height in centimetres of the elephant in the stamp be ?
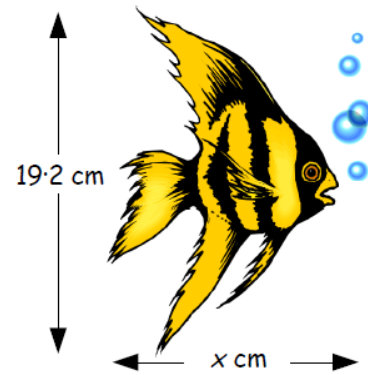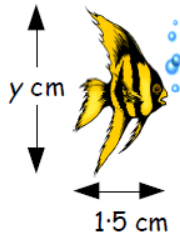
5. What must the **reduction scale factor** have been in this diagram ?

   6 m

   3 cm

Scale Drawing

6. Calculate the value of *x* and *y* in this figure which shows :-

    - a picture of a tropical fish   *y* cm
    - a **6 times** enlargement.

    1·5 cm

    19·2 cm

    x cm

7. A plan of a doll's house is drawn to a scale of :-   **1 cm to 12 cm.**

    If the door in the plan measures 1·5 cm, what is the actual height of the door in the doll's house ?
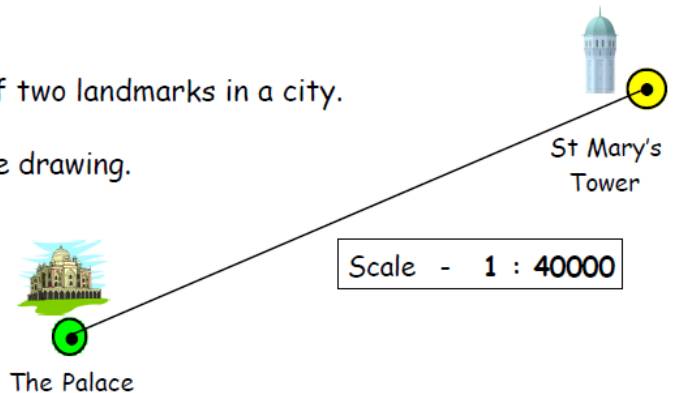
8. The scale drawing shows the relative position of two landmarks in a city.

    a   Measure the distance between them on the drawing.

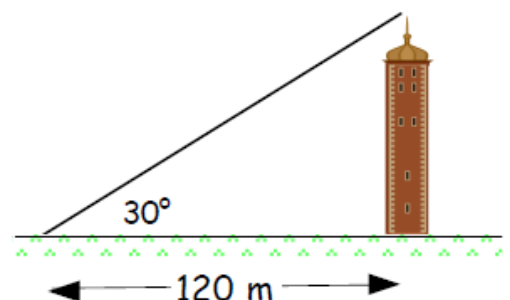   **b**   The scale of the drawing is **1 : 40000.**

    Calculate the **real** distance from the Palace to St Mary's Tower.

    St Mary's Tower

    Scale -   1 : 40000

    The Palace

9. **a**   Make a **scale drawing** of this sketch of a tower

    Scale -   **1 cm - 20 metres**

    b   Determine the **real** height of the tower.

    30°

    120 m

3

Scale Drawing

10. Write the **3 figure bearing** representing :-

    a   North East   b   South West   c   North West.

11. A pilot leaves the mainland to deliver mail to the villagers on a remote island.

    He sets off on a bearing of 080°.

   What bearing will he have to take to return to the mainland ?

12. An ambulance helicopter takes off from the hospital
    on a bearing of 070° for 80 km to a fire accident,
    then flies the injured on a bearing of 200° for
    50 km to a specialist burns unit.

    a   Make a **scale drawing** showing the
             route the helicopter took.

    b   How far must the helicopter travel from
             the burns unit to return to the hospital ?

    c   On what bearing should the the pilot fly
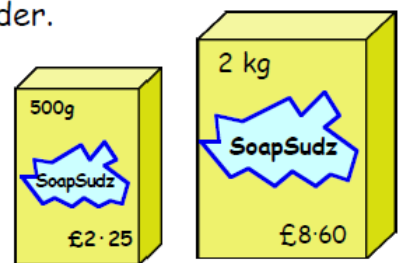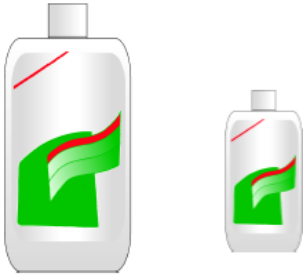   for the journey back to the hospital ?

N

80 km

50 km

Hospital

Burns Unit
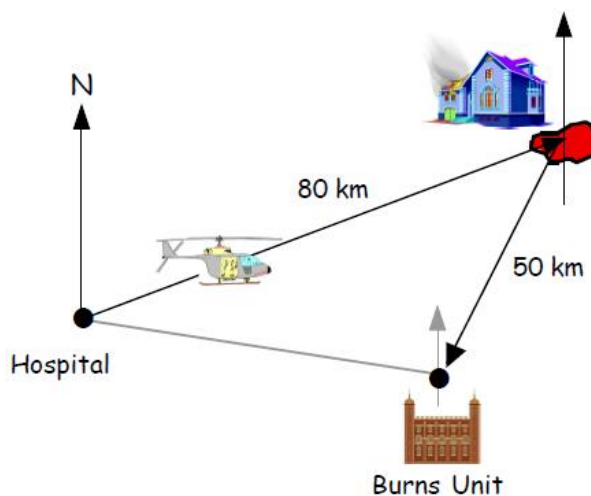
Money

1. A large box of *SoapSudz* costing £8·60 has 2 kg of soap powder.

   A small box has 500g of soap powder and costs £2·25.

   a   How much does it cost per 100g for the large box ?

   b   How much does it cost per 100g for the small box ?

   c   Which is better value ?

2. A large bottle of *FABRIK* conditioner costing £7·20 contains 1·5 litres.

   A small bottle has 250 ml and costs £1·25.

   Which is better value ? (*Explain your answer fully*).

3. Josh is going on holiday to France.

   He sees two adverts for currency exchange.

   Which is the better value ? (*Explain*)

   Xchange

   1·17€ to £1

   EuroChange

   £100 buys you 120€

4. Billy exchanged £1600 for $2560.

   Shaz exchanged £1450 for $2392·50.

   Who got the better exchange rate ? (*Explain*).

5. On the planet QUARK, Jez exchanged 571 splinkees for 1558·83 trindles.

   What is the rate of exchange on QUARK ?

Money

6.

Paul bought a new car which cost £8500.

He paid for the car on a Hire Purchase contract agreement.

He paid a £1500 deposit and £250 a month for 3 years.

a   How much would he have saved if he paid cash ?

b   Why do you think he chose hire purchase ?

7.   Zara expects her bathroom project to take about 5 hours to complete.

She needs a professional plumber to do the job.

> **Plumb Services** charge a £60 call out fee plus £45 per hour labour.
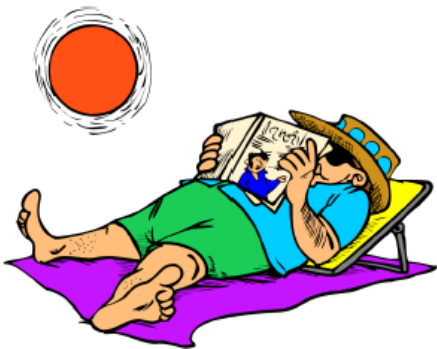>
> **Plumbers & Co.** do not charge a call out fee but charge £55 per hour.

a   Which plumber should she use ? (*Explain*).

b   The job ends up taking 8 hours.

Would she have been better choosing the other company ? (*Explain*).

8.

Jake needs a taxi to take him to the airport 24 miles away for his holiday flight.

QwikCabs charge £5 for the first 5 miles then 75p per mile.

FastCars would charge £20 for the total journey.

CabbieCars charge 90p per mile.

Which taxi would be the **cheapest** for his journey ?

Money

9. *PowerCo*. charges Mr. Timpson £1400 per annum for all his household Gas and Electricity.

   EnergyService promises to reduce his monthly payments by 8%.

   GasElecCo. will charge him £108 per month.

   Which is the better deal for Mr. Timpson ? (*Explain fully*).

10. On her mobile phone, Grace works out that she uses an average of 250 minutes of calls and 350 texts each month.

    Three options are as shown :-

• £15 per month	200 min free - then 10p/min,	200 free texts then 5p/text
• £21·50 per month	300 mins free - then 12p/min,	300 free texts then 10p/text
• £25 per month	400 mins free - then 20p/min,	free texting,

    a   How much would it cost Grace each month if she joined each of the above options ?

    b   Which option should she choose ? (*Explain*).

    c   Last month, Bazza used 300 mins and 310 texts. Which option is the cheapest for Bazza ?

    d   Explain why Bazza might choose the 3rd option.

11. a   Ed earns £1650 per month. How much does he earn per year ?

    b   Jo earns £27 240 per annum. How much is her monthly payment ?

    c   Ari earns £245 per week. How much does he earn in a year ?

12. Harry earns £16 per hour as a courier manager.

    a   How much will he earn in a week if he works for 40 hours ?

    Last week Harry also worked overtime. He is paid £20 per hour overtime.

    b   How much did Harry earn in overtime pay if he work 4 extra hours ?

    c   What was his **total** pay for last week ?

Money

13. a

Lennie earns £14 500 a year as a technician.

From his wages he pays £3420 deductions.

What is his take-home (**net**) pay ?

b

Alan has a **net** income of £12 870 per year.

If his **gross** income is £16 450, how much are his deductions ?

14. Sheila has a **gross** income of £23 500 per annum.

She has a total of 12% deductions of her **gross** pay.

a   How much are her deductions ?

b   Calculate her **net** income.

15. Debbie takes out a loan of £4000 to buy a car.

She has to pay back £135 a month for 4 years.

How much will she pay back **in total** ?

16. Donnie borrowed £80 000 to buy a new flat.

He pays back £450 a month for 25 years.

What is the **difference** between what he borrowed and what will pay back ?

3-Dimensional Shape

1. Debbie is buying some perfume for her Mum. The perfume bottles are different shapes like the ones below:
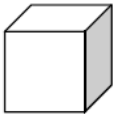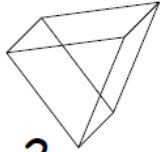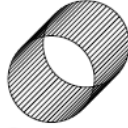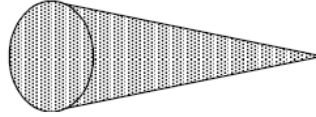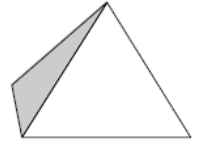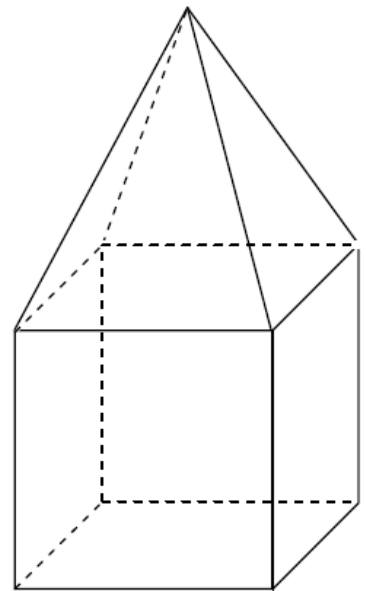

| 1 | 2 | 3 | 4 | 5 |

Write down the name of each of the shapes above and state how many faces, edges and vertices they have.
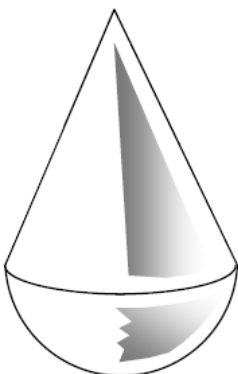
2. The diagram shows a 3D-shape made up from two different solid shapes.
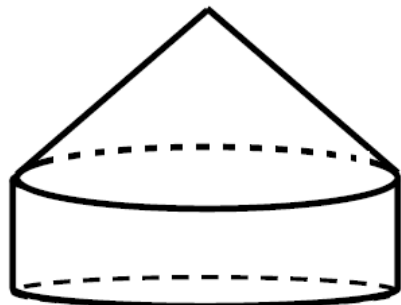

   (a)   What two shapes have been used?

   (b)   How many faces are there?

   (c)   How many edges are there?

   (d)   How many vertices are there?

3. Repeat question 2 for these shapes.

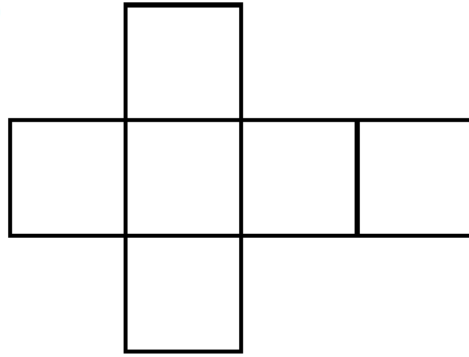   **(a)**   **(b)**

3-Dimensional Shape
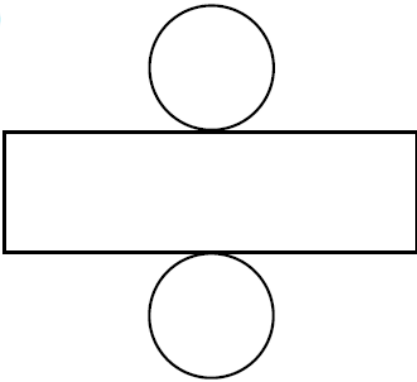
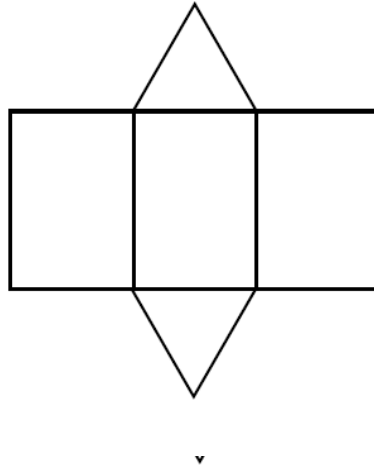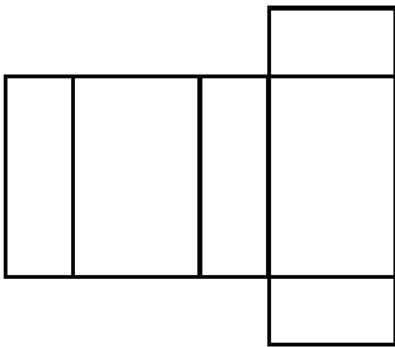4. Write down the name of each shape shown in the nets below.
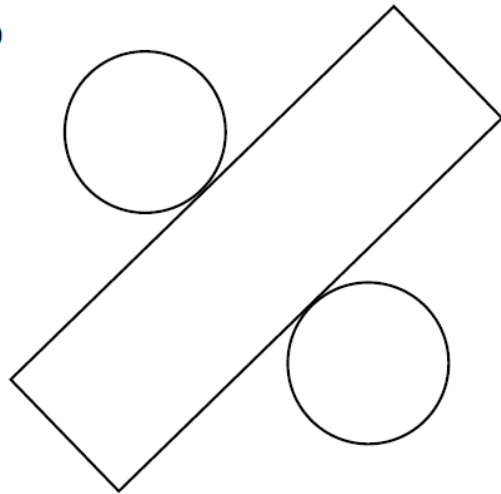
(a)
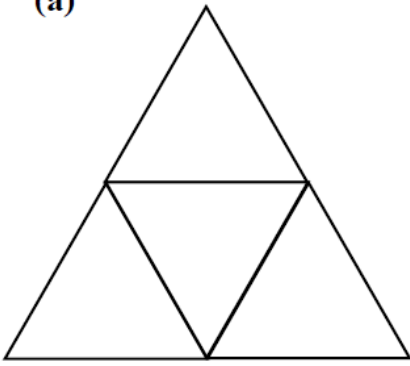
(b)

(c)

(d)

(e)

(f)

(g)
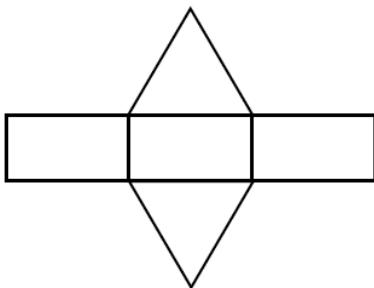
(h)
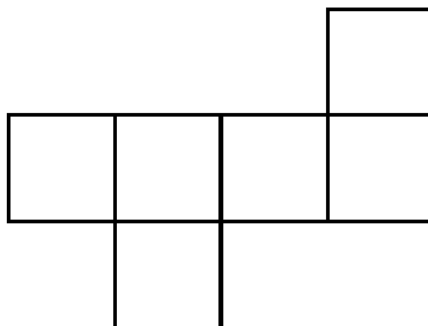
3-Dimensional Shape

5. For each shape i) sketch the net and ii) calculate the surface area.

a)

3cm

3cm

8cm

b)

6m

4m

5m

c)

2cm

8cm

10cm

d)

2cm

6cm

1cm

e)

10cm

8cm

12cm

6cm

f)

4cm

5cm

20cm

6cm

g)

26cm

26cm

24cm

9cm

20cm

h)

50cm

48cm

60cm

14cm
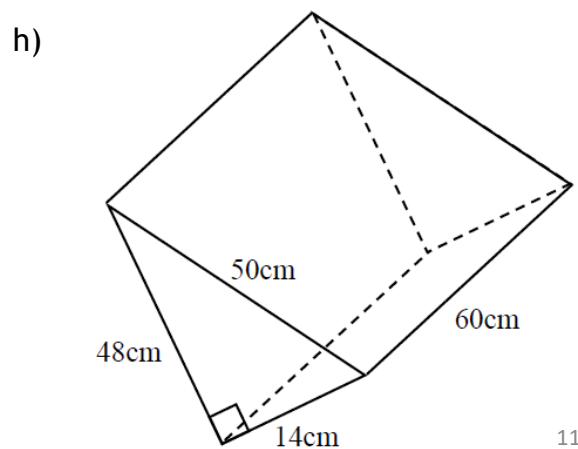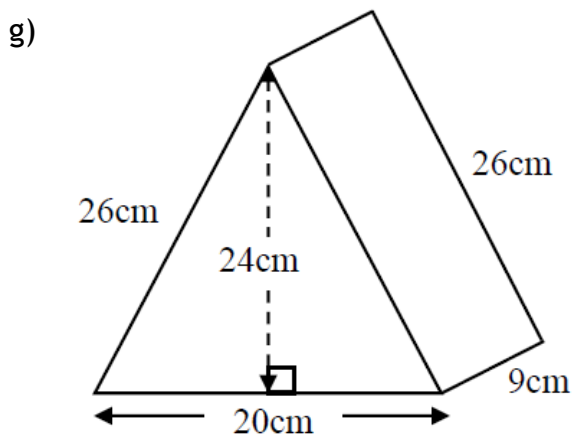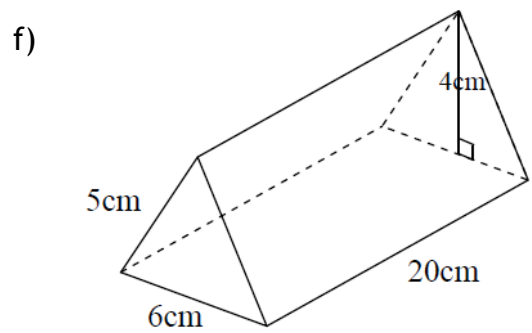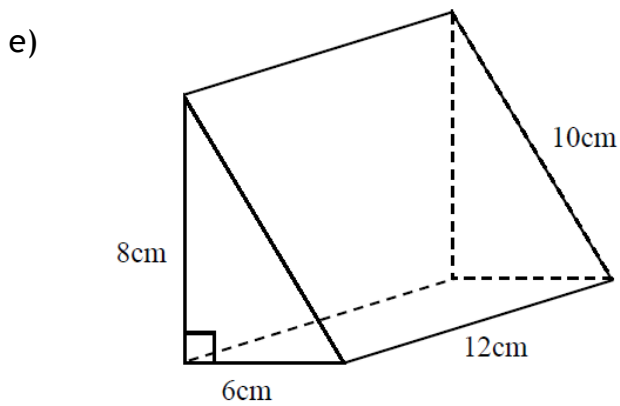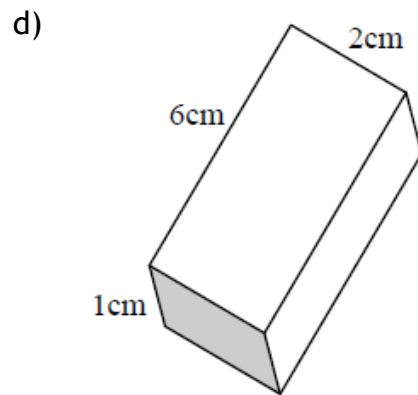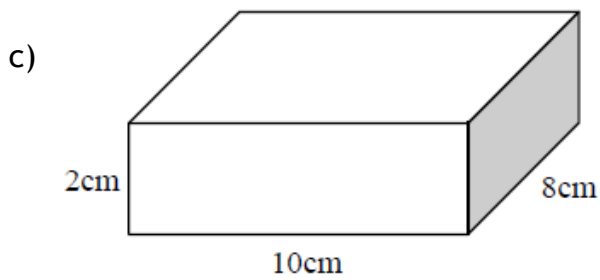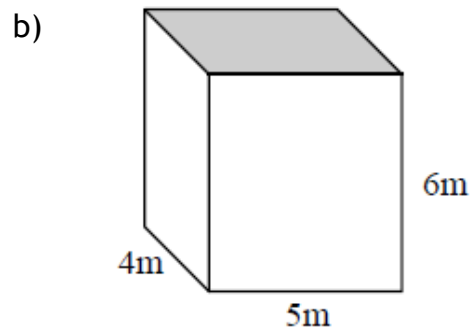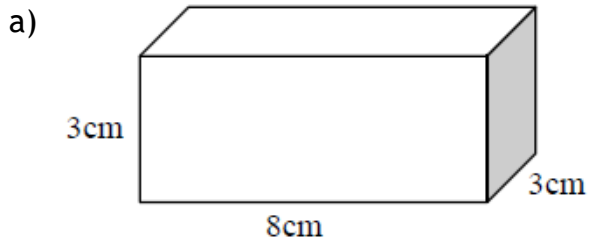
Volume

1. Calculate the volume of the cuboids shown below.

(a)

3cm 8cm 3cm

(b)

6m 4m 5m

(c)

2cm 10cm 8cm

5m

(d)

12mm 25mm 40mm

(e)

2cm 6cm 1cm

(f)

7m 7m 7m

(g)

2cm 22cm 14cm
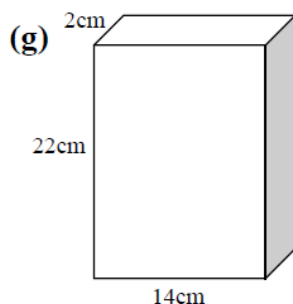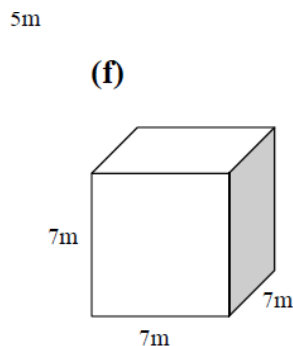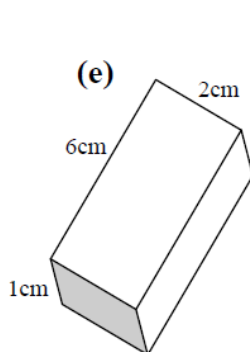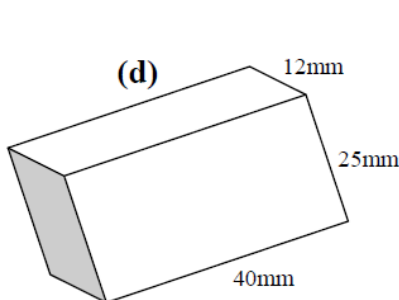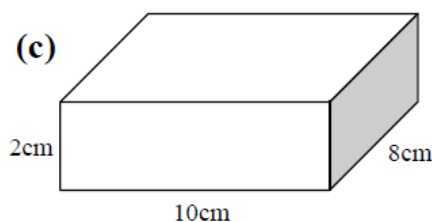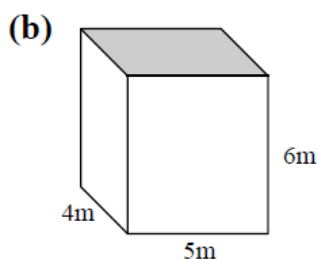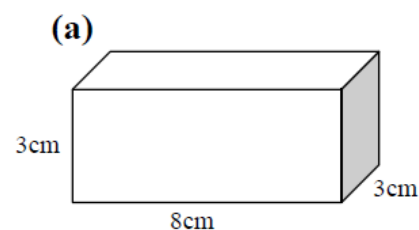
2. Calculate the volumes of the cuboids measuring:

   (a) 12cm by 8cm by 9cm   **(b)** 18mm by 12mm by 3mm

   (c) 50cm by 20cm by 5cm   **(d)** 15m by 7m by 8m

   (e) 11mm by 9mm by 2mm   **(f)** 4·3cm by 2·2cm by 10cm

3. Calculate the volumes of the cubes of side:

   (a) 6cm   **(b)** 4mm   **(c)** 14cm   **(d)** 23mm

4. Convert each of the following volumes in *cubic centimetres* into *litres*:

   (a) $3000cm^3$ **(b)** $2400cm^3$ **(c)** $12600cm^3$ **(d)** $600cm^3$

   (e) $1460cm^3$ **(f)** $480cm^3$ **(g)** $320000cm^3$ **(h)** $2565cm^3$

Volume

5. Calculate the volume of water in the tanks shown below. Give your answer in *litres*.

(a)

8cm

30cm

10cm

(b)

6cm

40cm

9cm

(c)

14cm

25cm

12cm
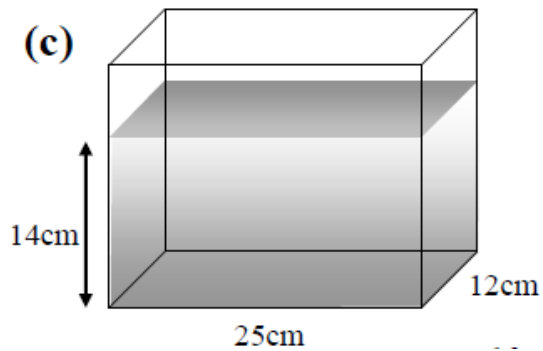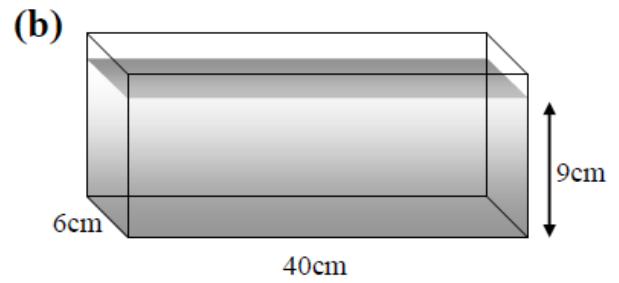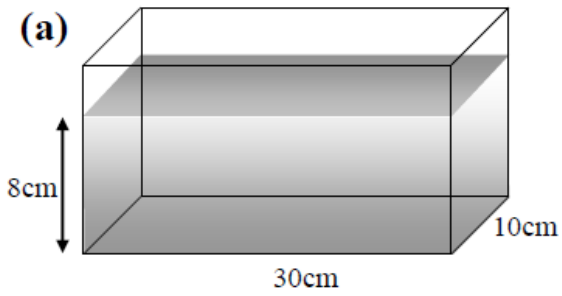
6. Calculate the volume of the triangular based prisms.

(a)

12cm

$A = 2.5cm^2$

(b)

$A = 5.4cm^2$

15cm

(c)

21cm

5cm

6cm
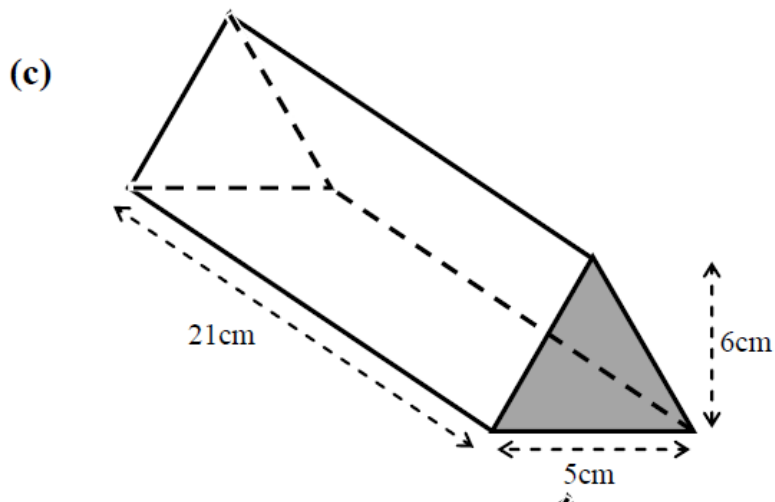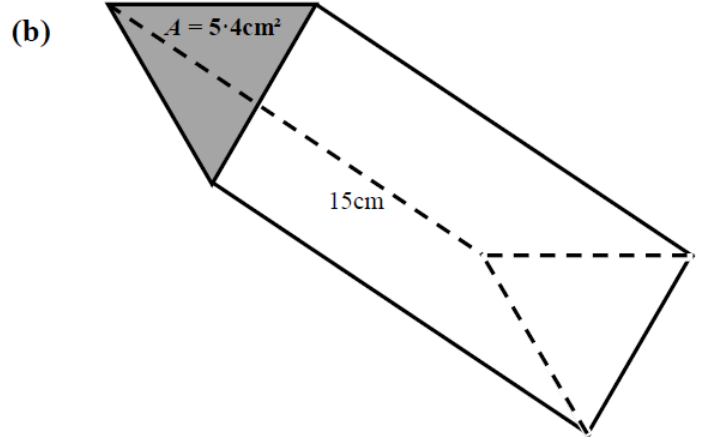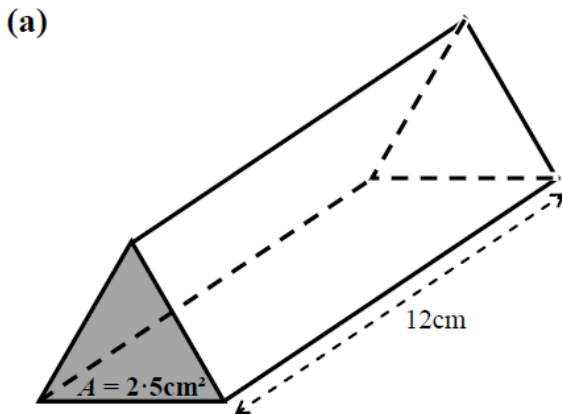
Strathaven Academy

Level 3 – Unit 4

Revise and Review

- Scale Drawing
- Money
- 3D Shape
- Volume

This section provides further examples that may be used to revise prior to the Unit 4 Test or for consolidation and review as required on completion of the unit.

Scale Drawing

You will need a ruler and a protractor

1. Shown is a truck drawn to a scale of 1 cm = 3 m.

    (a) Measure the length and height of the model truck.

    (b) Calculate the length and height of the real truck.

7cm

2. Shown is a sketch of a garden with its dimensions given.   The scale is 1 cm = 4 m.

    (a) Calculate the real length and breadth of the garden.

    (b) Calculate the real length of the diagonal path.

    (c) Calculate the perimeter of the garden.

2cm
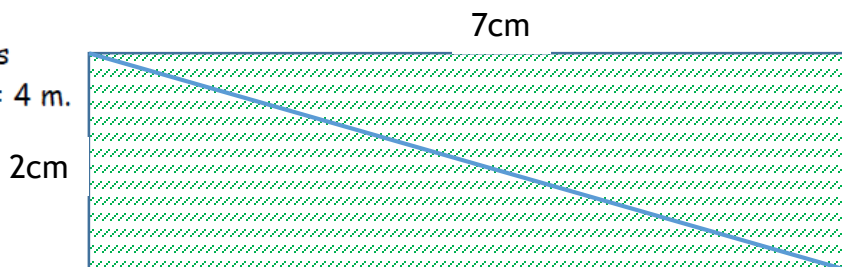
3. Make an accurate scale drawing of this triangular pennant using a scale of

    1cm = 5m

20 m

75 m
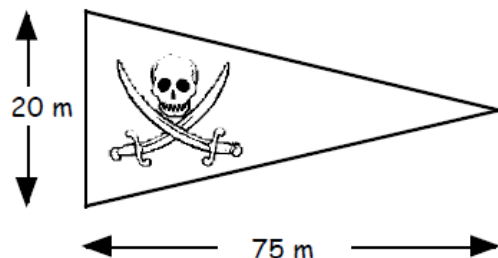
4. Joy is travelling North East on Crow Road.

    (a) What direction would Joy be travelling if she left the roundabout :-

        (i) on Addy Road   (ii) on Tern Road   (iii) on Bro Road ?

    May is on Fort Road travelling towards the roundabout.

    (b) What direction is May travelling ?

    (c) How many degrees would she turn if she exited on

        (i) Grey Road   (ii) Bro Road   (iii) Tern Road ?

Pi Rd

Fort Rd

Grey Rd

Tern Rd

Addy Rd

Crow Rd

Bro Rd
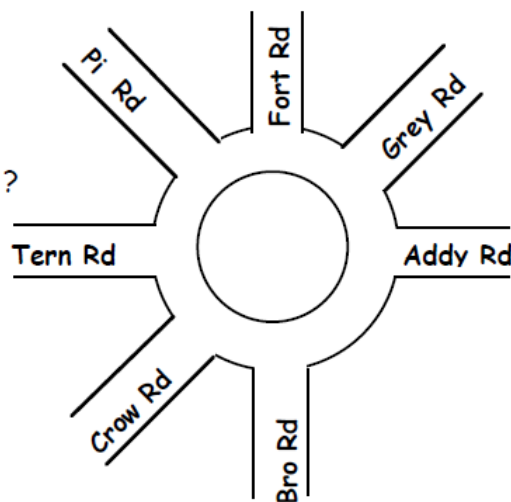
5. Use a protractor to measure the bearings from Astone :-

    (a) North

    Beestone

    Astone

    (b) North

    Astone

    Destone

    (c) North

    Enston

    Astone
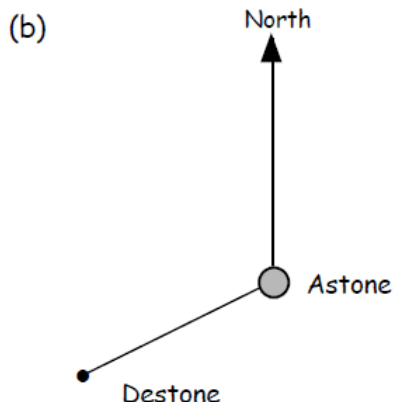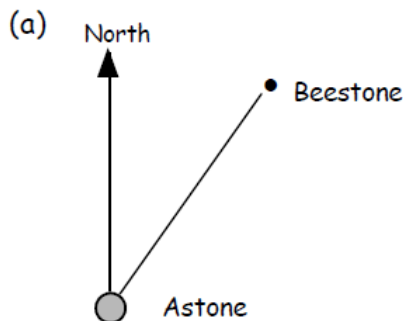
Scale Drawing

6. The sketch shows the voyage of a boat which sailed
    North East from Port to Cara Island, then West
    to Hollow Island.
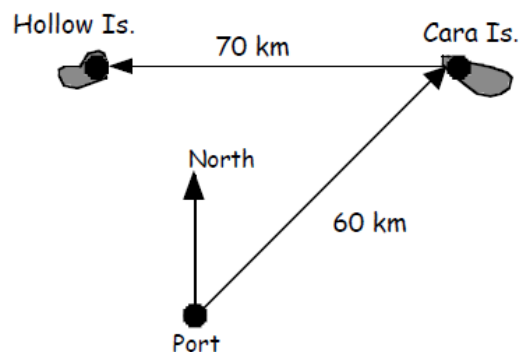
    (a) Make a scale drawing of the voyage
         using a scale of 1 cm = 10 km.

    (b) How far away is the boat then from
         its starting point in kilometres ?

    (c) What bearing would the boat have to take
         from Hollow Island to return to port ?

Hollow Is.

70 km

Cara Is.

North

60 km

Port

7. From an airport an jet takes a bearing of 080° and flies for 600 km.
    The pilot then changes course and flies 400 km on a 300° bearing.

    (a) Make a scale drawing of the aeroplane's journey.

    (b) Find the distance and bearing the pilot would need to take
         to fly directly back to the airport.
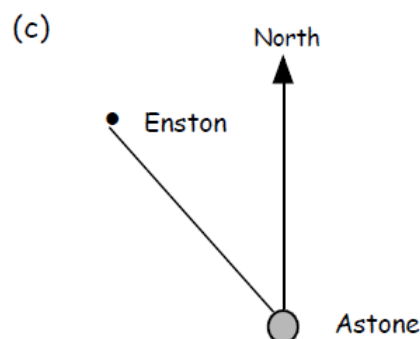
8. From its burrow a rabbit takes a bearing of 060° to get to the lettuce patch.

    What bearing would the rabbit have to take to get from the lettuce patch back to its burrow ?

Money

1. Paula bought two skirts at £7·75 each three blouses at £6·50 each and a pair of shoes for £18·99.
   How much change did she get from three £20 notes.

2. Ellen paid a deposit for a new washing machine priced £499.
   She then paid 12 equal monthly payments of £37·56.
   How much was the deposit ?

British Pound (June 2017)

American Dollar	1·29
Chinese Yen	8·75
Danish Krone	8·53
Euro	1·15
Hong Kong Dollar	10·02
Indian Rupee	82·9
Japanese Yen	143·18
Mexican Peso	23·95
Norwegian Kroner	10·88
Swiss Franc	1·25

3. Exchange :-
   (a) £30 to euros
   (b) £2500 to €
   (c) £87 to €
   (d) 288 € to £
   (e) 1850 € to £
   (f) 0·18 € to £

4. Exchange :-
   (a) £60 to Rupees
   (b) 1040 Japanese yen to £
   (c) 22 500 Kroner to £
   (d) £180 to Swiss Francs
   (e) $800 to £
   (f) 100€ to $.

5. Diego changed 2000 pesos into £. He spent £50 before changing back to pesos.
   How many pesos did he receive ?

6. Yi had 1 000 000 Japanese Yen. He exchanged his yen and went to London where he spent £350.
   Yi then flew to Las Vegas losing the remainder of his money.
   How much did Yi lose ? (Give your answer in yen).

7. Mr. Lee took 80 000 yen to Glasgow where he spent £260.
   After exchanging back to yen he found he had just over   **40000 yen.**
   What nationality was Mr. Lee ? Explain.

Wages

1. George is paid £1950.50 per month. Calculate his annual pay.

2. Emile is paid £7.80 per hour as a library assistant.
   How much did he earn last week in which he worked for 38 hours?

3. Dobbs, the Landscape Gardeners, pays its workers a basic rate of £7.20 per hour.

   a) What would the overtime hourly rate be at "double time"?
   b) What would the overtime hourly rate be at "time and a half"?

4. Natalie works for Dobbs. On Sunday she worked 4 hours overtime at "double time".
   How much overtime pay did Natalie receive?

5. Billy works in a florist shop. The owner pays him a basic rate of £9.90 per hour.
   Last week Billy worked his normal basic 40 hours.
   He also did 5 hours overtime at "time and a half".

   Calculate

   a) Billy's basic pay   b) his overtime pay

   c) the total amount Billy was paid last week.

6. Last year Nadia's pay was £12400. This year she received a 4% pay rise.

   a) Calculate the actual pay rise due to Nadia.

   b) Now calculate Nadia's new annual pay.

7. Davie sells cars for Hamilton's Motors. He receives 3% commission on any car he sells.

   He sold a new Renault car for £13500. How much commission is he due?

8. Shown is Johnny Rotten's pay slip. Calculate his NET pay for the week.

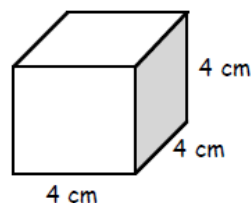| BLOGGS ENGINEERING					
Name :- Johnny Rotten		Works No. :- 17541		Week No :- 22	
Income	Basic – £755·95	O/Time – £89·77	Bonus – £25·00	Total – £.........	
Deducts	I. Tax. – £161·30	Superan – £39·25	Nat Ins – £44·57	Total – £.........	
				Net Pay	£............

18

3D Shape

1. Draw the net of a cube with side :-

   (a) 1 cm

   (b) 3 cm

2. (a) Calculate the area of the front face of this cube in cm².

   (b) Calculate its total surface area.

   4 cm
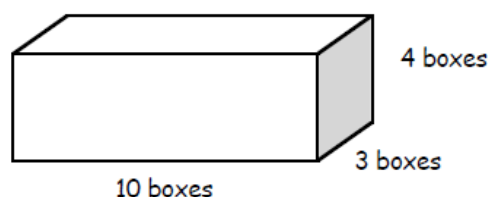   4 cm
   4 cm

3. Find the total surface area of a cube with side :-

   (a) 5 cm

   (b) 10 cm
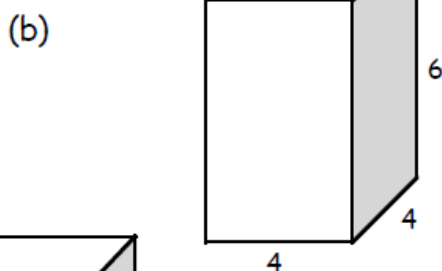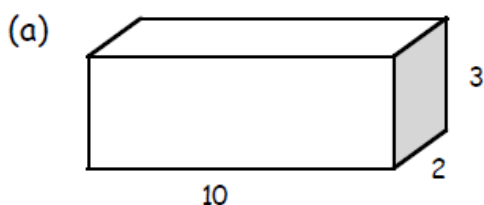
   (c) 7·5 cm

4. (a) Neatly draw a net of the cuboid shown.

   (b) Calculate the total surface area of the cuboid.

   Start with : area of front face
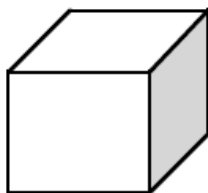   area of back face etc...

   4 boxes
   3 boxes
   10 boxes

5. . Calculate the total surface area of each cuboid :-

   (a)

   3
   2
   10

   (b)

   6
   4
   4

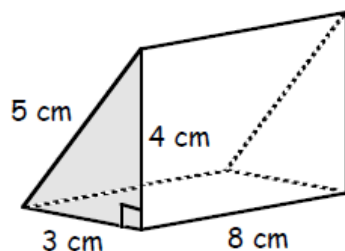6. . The total surface area of this cube is 486 cm².

   Calculate the length of a side.

7. (a) Make a rough sketch of the net of the triangular prism and show all dimensions on your diagram.
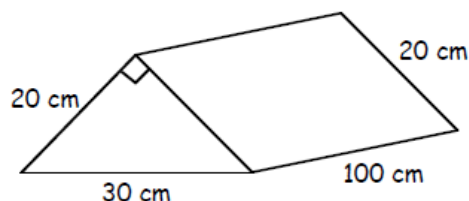
   (b) Make an accurate drawing of the net.

   (c) Calculate the total surface area of the prism.

   5 cm
   4 cm
   3 cm
   8 cm

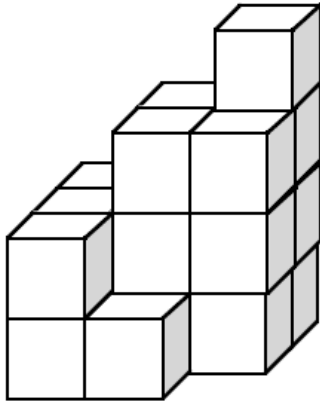8. A dolls tent which has **no floor** has dimensions as shown.

   (a) Sketch a net of the tent.

   (b) Find the total area of tent material.

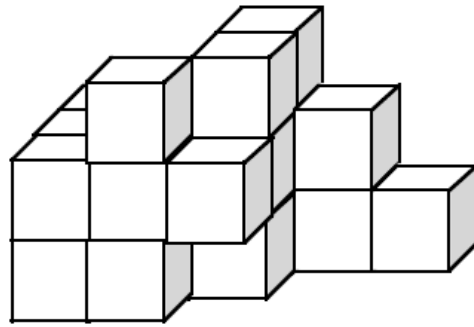
   20 cm
   20 cm
   30 cm
   100 cm

Volume

1. Work out the volumes (in cm^3) of the following shapes :-

   (a)

   (b)

2. Use the formula to find the volume of each of the following cuboids :-

   (a)

   20 cm

   20 cm

   10 cm

   (b)

   8 cm

   6 cm
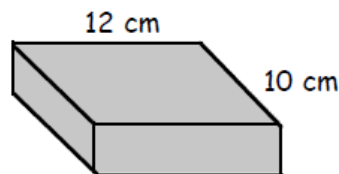
   10 cm
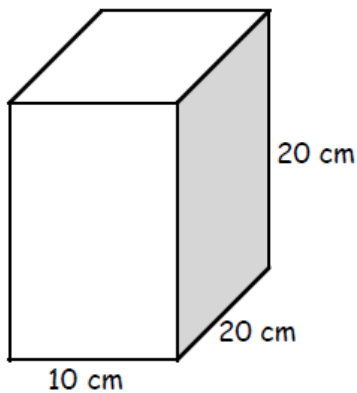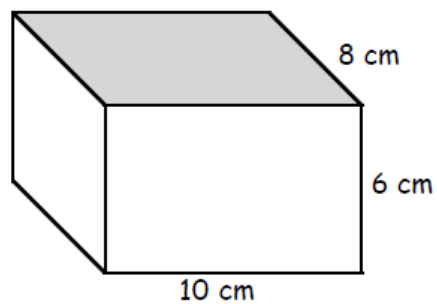
3. Each of the cuboids in question 2 are hollow.
   How many litres would each hold ?

4. The volume of the box shown is 360 cm^3.
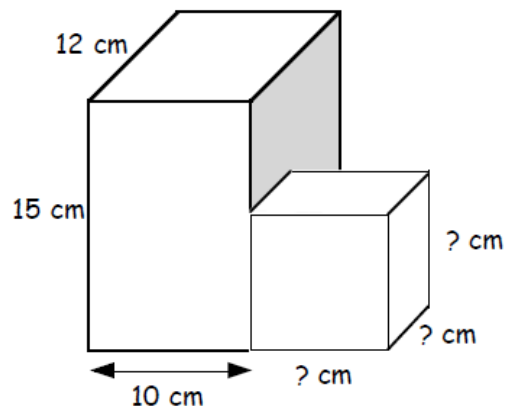   Find the height of the box.

   12 cm

   10 cm

5. This shape consists of a cube and a cuboid.
   The total volume of the shape is 2312 cm^3
   Determine the length of the edges of the cube.

   12 cm

   15 cm

   ? cm

   ? cm

   ? cm

   10 cm

Volume

6.

50 cm

30 cm

60 cm
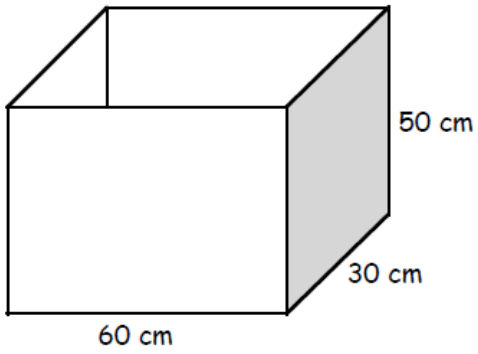
An empty aquarium has dimensions as shown.

The tank must be at least **three quarters full** of water for the fish to survive.

What is the <u>minimum</u> volume of water that must be poured into the tank ?

(*answer in litres*)

Scale Drawing

1a) Length = 4cm   Breadth = 2·5cm

1b)   1cm = 3m
        4cm = 12m
       2·5cm = 7·5m

2a)   1cm = 4m
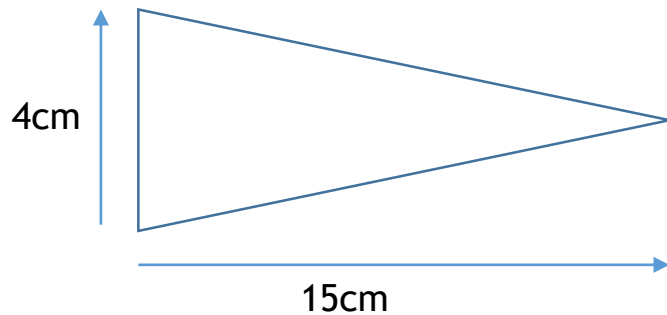   2cm = 8m
        7cm = 28m

2b) Diagonal = 7·2cm
              = 28·8m

c)   P = 72m

3a)   1cm = 5m
        4cm = 20m
       15cm = 75m

4cm

15cm

4a) East, West, South   b) South   c) 45°   180°   270°

5a) 035°   b) 245°   c) 320°

6a) See Drawing 6cm = 60km 7cm = 70km   b) 5cm = 50km   c) 147°

7) see drawing   b) 4cm = 400km   218°

8) see drawing   240°

Money

1)   £6.01   2) £48.28
3) a) 34.50€   b) 2875€   c) 100.05€
   d) £250.43   e) £7.26   f) £2068.01
4) a) 4974 Rupees   b) £7.26   c) £2068.01
   d) 225 francs   e) £620.16   f) $112.17
5) 802.50 Pesos   6) 42773.20Yen   7) Japanese 42773.20 Yen

Wages

1. £23406   2. £296·40

3. (a) £14·40   (b) £10·80

4. £57·60

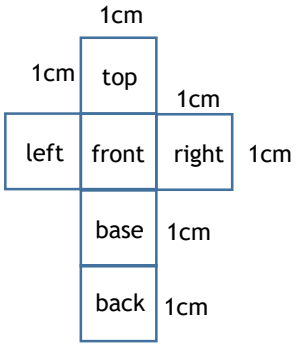5. (a) £396   (b) £74·25   (c)   £470·25
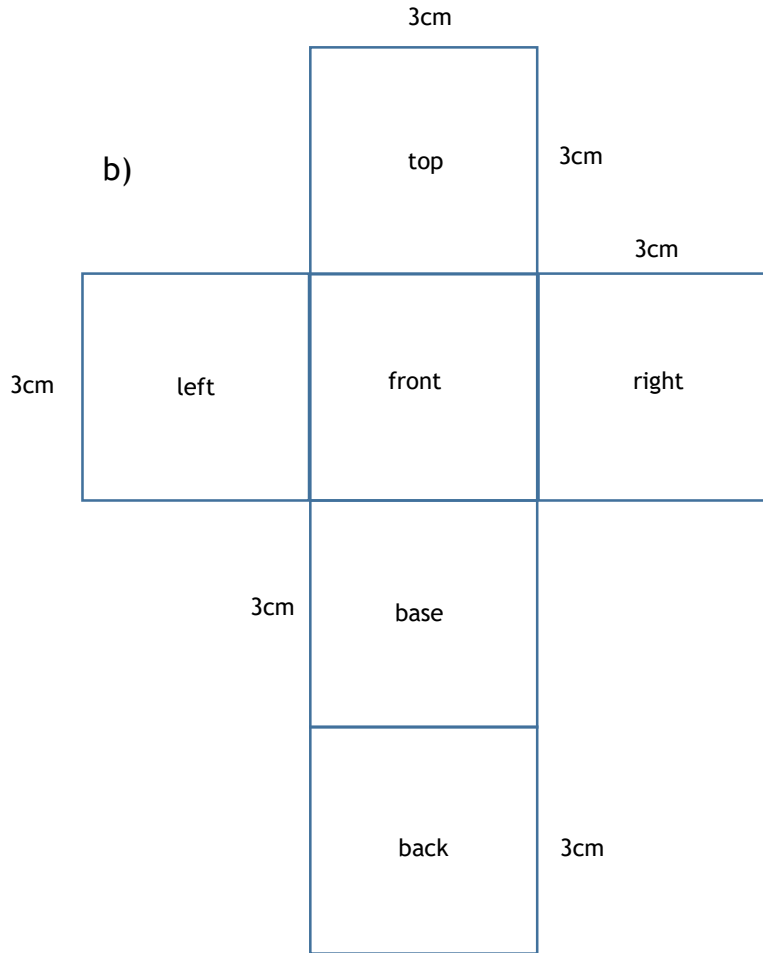
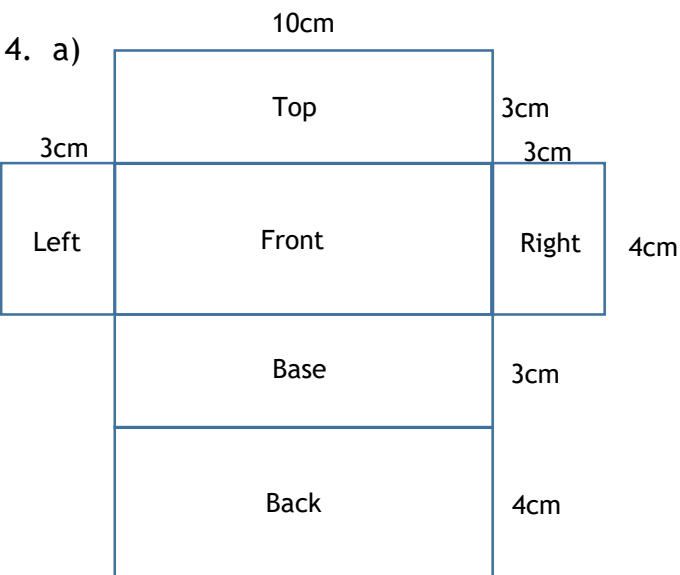6. (a) £496   (b) £12896   7.   £405   8.   £625·60

3D Shape

1. a)

	1cm	
1cm	top	
		1cm
left	front	right	1cm
	base	1cm
	back	1cm

b)

3cm

| | top | 3cm |

3cm

| 3cm | left | front | right |

| 3cm | base |

| back | 3cm |

2. a) 16cm²   b) 96cm²

3. a) 150cm²   b) 600cm²   c) 337.50cm²

4. a)

10cm

	Top	3cm
3cm		3cm
Left	Front	Right	4cm
	Base	3cm
	Back	4cm

b) 164 boxes

5. a   112 cm²   b   128 cm²

6. 9 cm

3D Shape

7. a)

5cm
4cm
5cm
4cm
3cm
8cm
4cm
5cm

b) 108cm²

8. a)

30cm
20cm
30cm
100cm
20cm
20cm
20cm
30cm
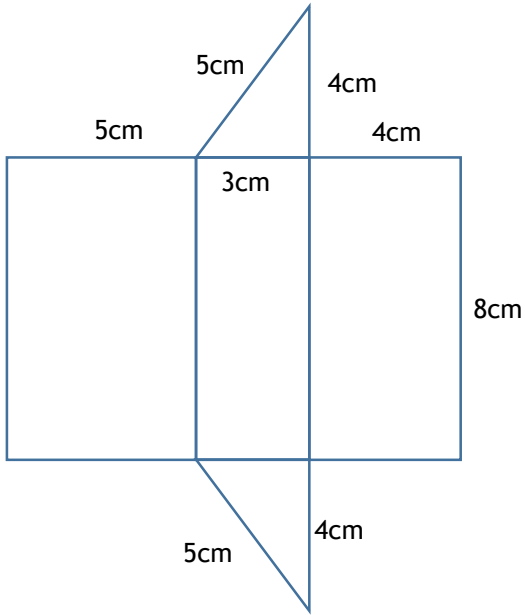
b) 4400cm²

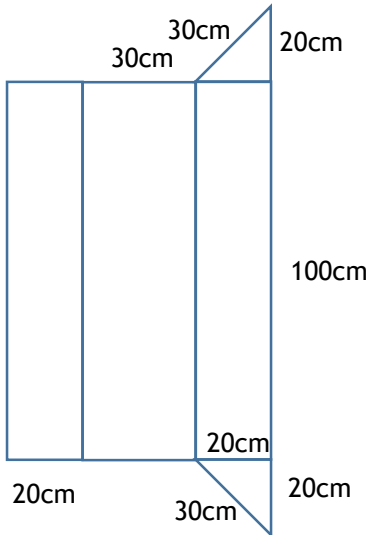## Volume

1. a 20 cm³   b 23 cm³
2. a 4000 cm³   b 480 cm³
3. a 4 *l*   b 0·48 *l*
4. 3 cm
8. 8 cm
6. $67\frac{1}{2}$ litres