Cumbernauld Academy

Mathematics Department

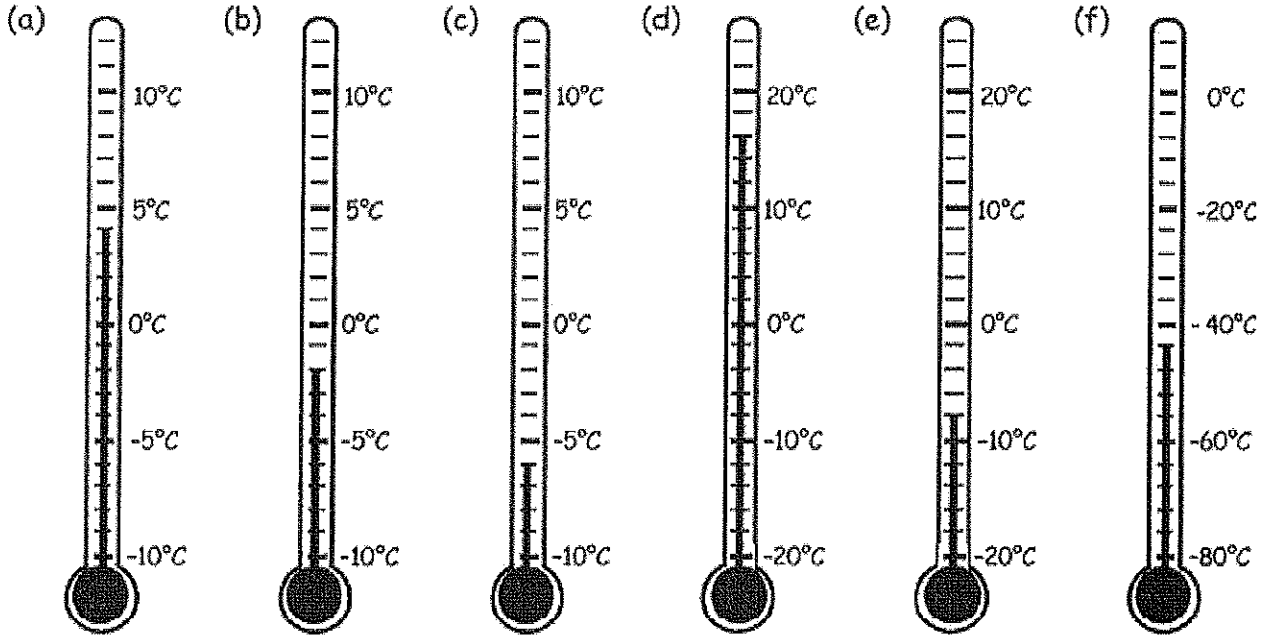
3rd Level Core

Block 3 - homework booklet

MNU 3-04a: I can use my understanding of numbers less than zero to solve simple problems in context.

Exercise 1

1. Write the temperatures shown by each thermometer.



2. (a) I had £30 in my bank account. I withdrew £45. What was my new bank balance ?
   (b) John had £35 in his account. He withdrew £60. What was his new bank balance ?
   (c) Susie had £30 in her bank account. After withdrawing some money, her balance was then (-£40). How much money had she withdrawn ?

3. Write the ages of these Romans when they died :-
   (a) Bigus Thickus born in 80 B.C. and died in 4 A.D.
   (b) Uglis Puglis born in 12 B.C. and died in 37 A.D.
   (c) Maximus Bumus born in 53 B.C. and died in 7 A.D.
   (d) Pukus Mucus died in 47 A.D. and was born in 54 B.C.

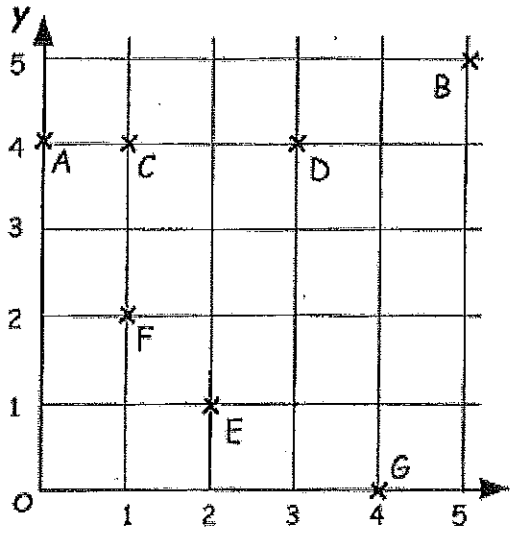
Exercise 2

1. What is the temperature that is :-
   (a) 7°C up from 2°C ?
   (b) 5°C up from 5°C ?
   (c) 10°C up from 0°C ?
   (d) 5°C down from 7°C ?
   (e) 12°C down from 15°C ?
   (f) 7°C down from 0°C ?
   (g) 3°C up from -2°C ?
   (h) 7°C up from 1°C ?
   (i) 5°C up from -7°C ?
   (j) 9°C down from 4°C ?
   (k) 3°C down from -4°C ?
   (l) 25°C down from -25°C ?

MNU 3-18a: I can use my knowledge of the coordinate system to plot and describe the location of a point on a grid

Exercise 1

1. Look at the coordinate grid.



(a) Which point has an x-coordinate of 2 ?

(b) Which point has a y-coordinate of 5 ?

(c) What is the x-coordinate of D ?

(d) What is the y-coordinate of F ?

(e) Which point has its x-coordinate the same as its y-coordinate ?

(f) Which point lies on the x-axis ?

(g) Which point lies on the y-axis ?

2. (a) Draw a new grid (from 0 to 10 in each axis).

(b) Mark with a dot the following points and join them up in order.

G(2, 1) H(4, 1) I(4, 4) J(6, 4) K(6, 5) L(4, 5) M(4, 7) P(8, 7) Q(8, 9) R(2, 9) G(2, 1).

3. Draw a <u>10 by 10</u> coordinate grid.

(a) Mark with a dot the following points and join them up in order.

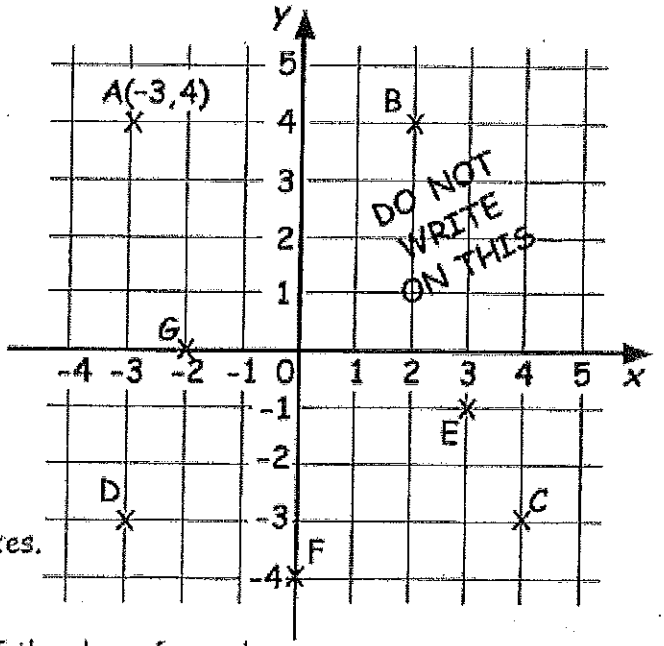
A(5, 1) B(2, 2) C(2, 4) D(3, 6) E(5, 7) F(7, 6) G(8, 4) H(7, 2) back to A.

(b) When the points are joined what is the name of the shape you have formed ?

Exercise 2E

1. The coordinates of A are (-3,4).

Write the coordinates of the other points.



(a) Copy the set of axes from question 1.

(b) Plot the following five points :-

J(2, 3), K(-1, 5), L(-4, 3), M(-4, -1) and N(2, -1).

(c) Name the shape formed when the five points are joined up in order.

2. (a) Draw a set of axes from -5 to 5 on both axes.

(b) Plot the points S(3, 2), T(5, 2) and U(6, 5).

(c) Join the three points and write the name of the shape formed.

(d) <u>Reflect</u> this shape over the x-axis.

(e) Write the coordinates of the vertices of the new shape found

MNU 3-11a: I can solve practical problems by applying my knowledge of measure, choosing appropriate units and degree of accuracy for the task and using a formula to calculate area or volume when required

Exercise 1

1. Change :-

(a) 5 cm to mm (b) 1·8 cm to mm (c) 15 km to m

(d) 10 m to cm (e) 1·5 km to m (f) 5·5 cm to mm

(g) 8·6 m to cm (h) 15·1 cm to mm (i) 10·05 cm to mm

(j) 7·5 km to m (k) 0·1 m to mm (l) 0·001 km to mm

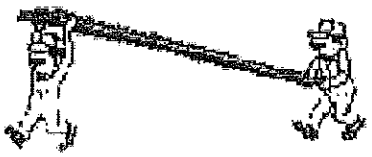
2. Which is the shortest in each of the following sets of distances :-

(a) 0·5 km, 300 m or 4000 cm (b) 100 000 mm, 5000 m or 10 km

(c) 0·0001 km, 0·11 m or 10·1 cm (d) 1 million mm, 100 001 cm or 1 km ?

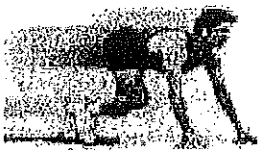
3. A 4·5 metre length of wood is cut in three places such that all the pieces are of the same length.

What is the length of each piece in millimetres.



4. Alf came 2nd in the 100 metre race. A video "close-up" showed that he had run 96·7 metres when the winner had crossed the line.

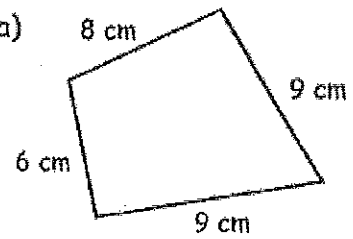
How many centimetres was Alf behind the winner ?



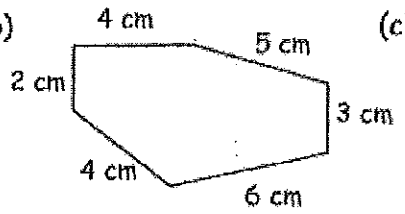
Exercise 2

1. Calculate the perimeter of each of the following shapes :-

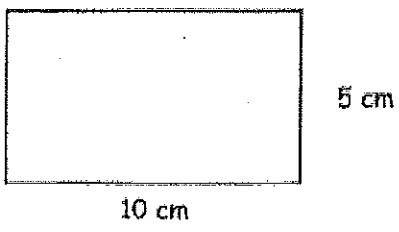
(a)



(b)



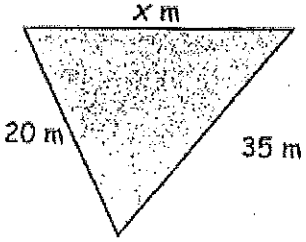
(c)



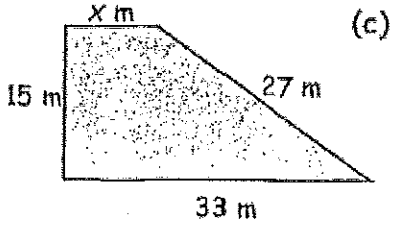
2. Each of these shapes has a perimeter of 80 metres.

Calculate the length of the sides marked x.

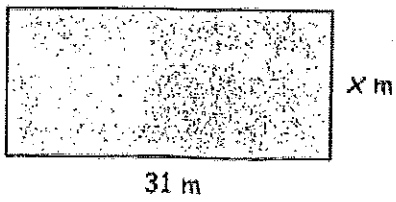
(a)



(b)



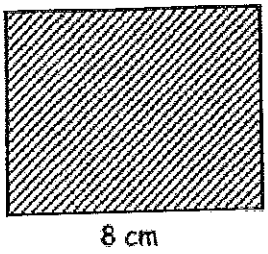
(c)



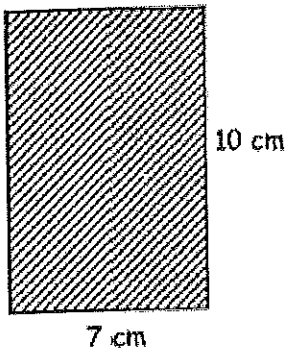
Exercise 3

1. Calculate the area of each of the following rectangles.

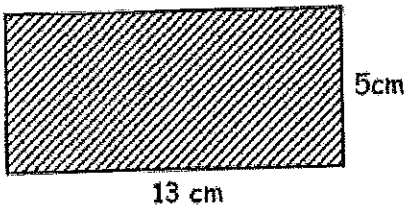
(a)



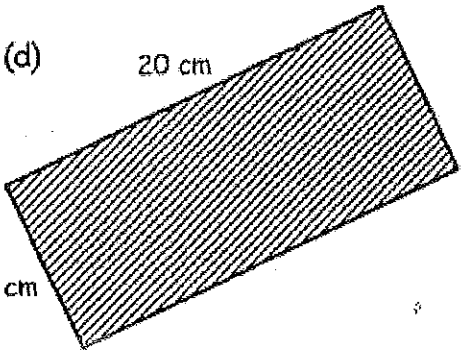
(b)



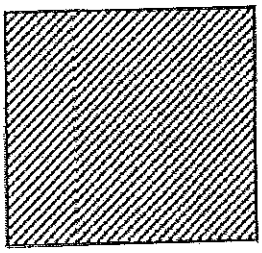
(c)



(d)

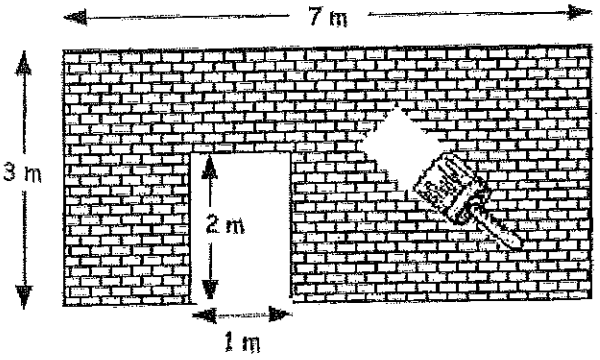


(e)



(f)

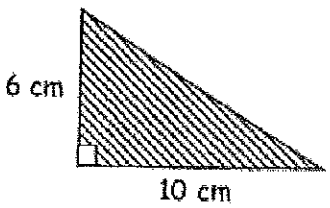
2. A wall is to be painted. A litre of paint will cover 4 m^2 and costs £4·50.
   (a) Calculate the area of the doorway.
   (b) Calculate the area of the wall to be painted.
   (c) How much will it cost to paint the wall ?



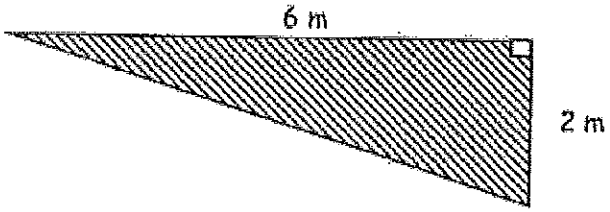
Exercise 4

1. Find the area of each of the triangles :-

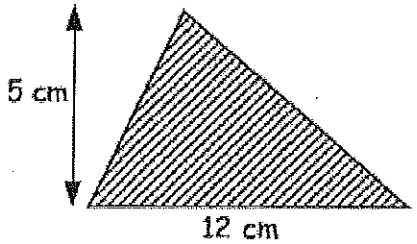
(a)



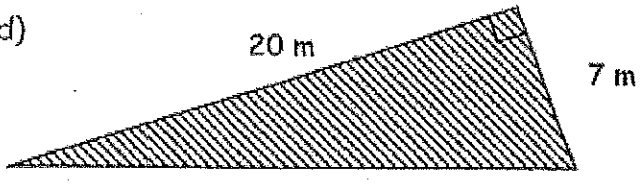
(b)



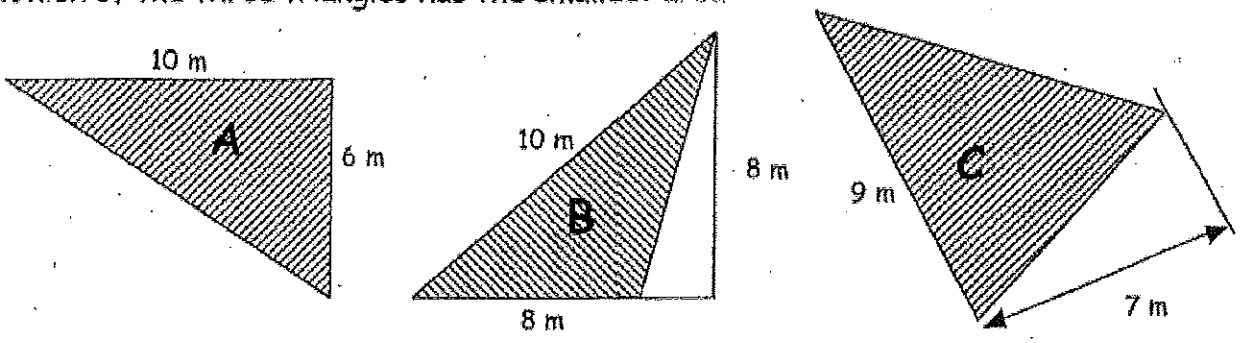
(c)



(d)



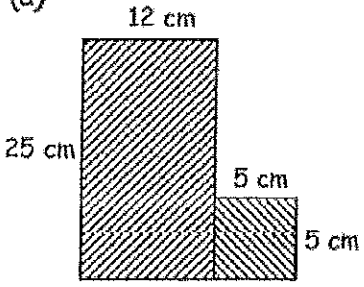
2. Which of the three triangles has the smallest area :-



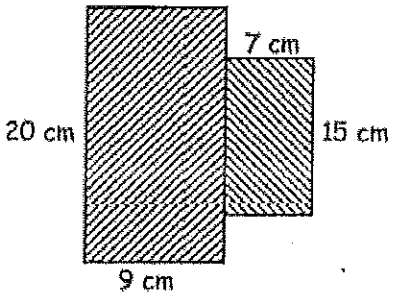
Exercise 7

1. Calculate the **total shaded area** of each shape below:-

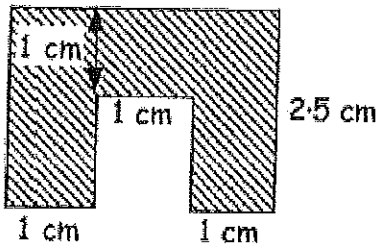
(a)



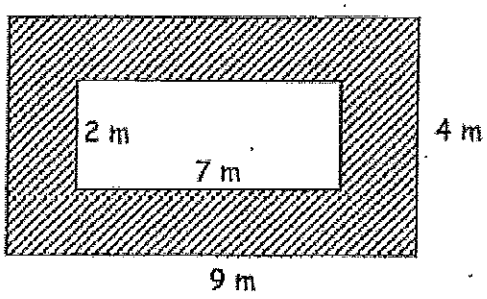
(b)



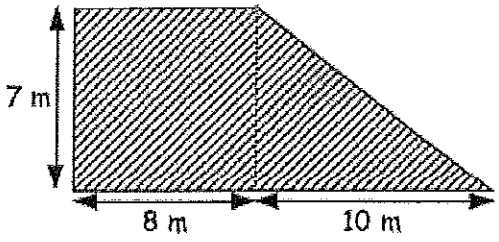
(c)



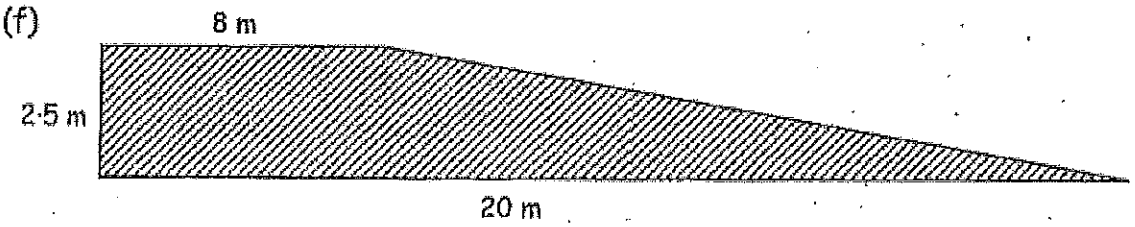
(d)



(e)

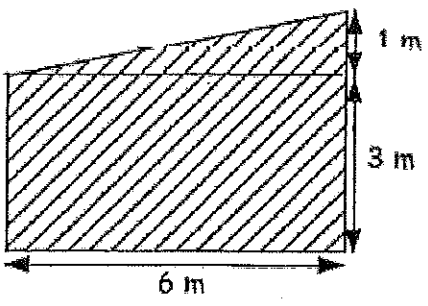


(f)



2. The side of a house is to be painted.
The paint costs £6·25 a litre and one litre will cover an area of eight square metres.

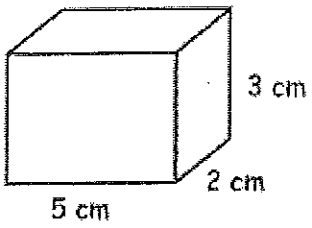
How much will it cost to paint the side of the house ?



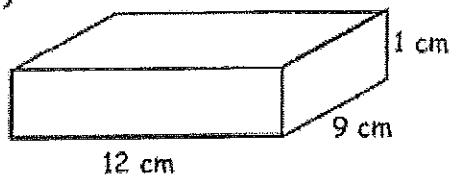
Exercise 8

1. Use the formula to calculate the volume of each of the following cuboids :-

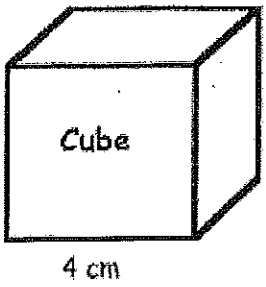
(a)



(b)

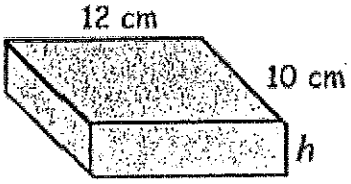


(c)



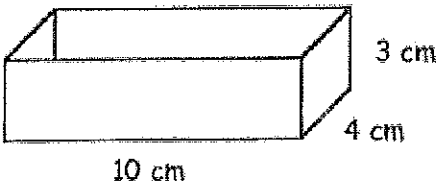
2. The volume of the box shown is 360 cm^3.

Find the height of the box.

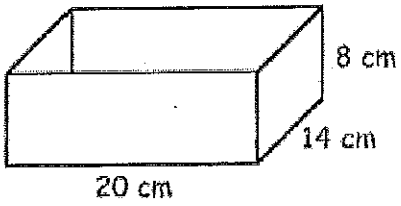


3. Calculate the volume of each (cm^3) and write how many millilitres each will hold when full.

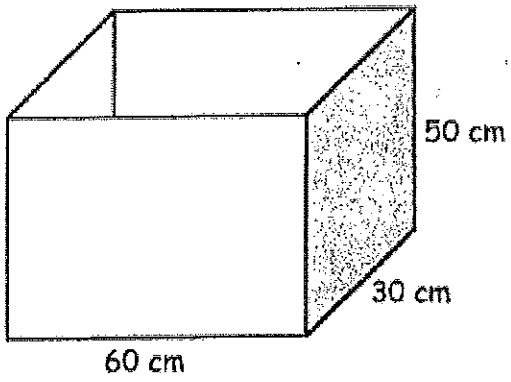
(a)



(b)



4.



An empty aquarium has dimensions as shown.

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

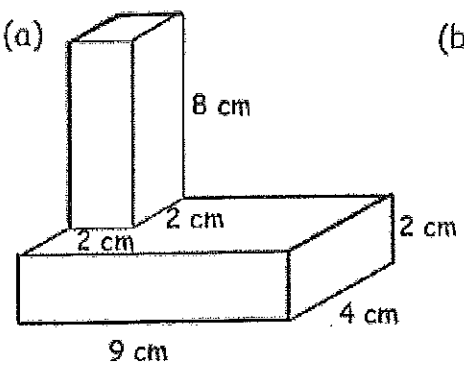
What is the <u>minimum</u> volume of water that must be poured into the tank ?

(*Answer in litres*)

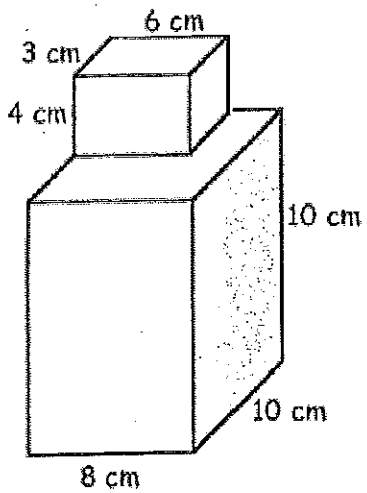
Exercise 9

1. Find the total volume of the following shapes :-

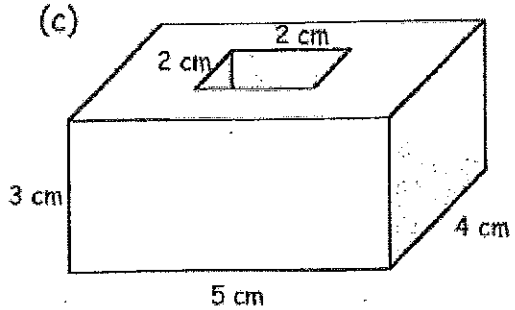
(a)



(b)



(c)



MNU 3-14a: I can collect like algebraic terms, simplify expressions and evaluate using substitution.

Exercise 1

1. Copy and simplify :-

(a) $8x + 4x$ (b) $3y - 2y$ (c) $9h + h$

(d) $12p - p$ (e) $5x + 3x + 4x$ (f) $9w + 5w + w$

(g) $c + c + c$ (h) $8k + 5k - 10k$ (i) $15q + 9q - 19q$

(j) $83d + 22d - 91d$ (k) $20z - 17z + z$ (l) $31h - 25h - 6h$

2. Copy and simplify :-

(a) $18x + 14x - 27x$ (b) $7y - y + 8y$ (c) $12i + 7i - 14i$

(d) $26t - t - t - t$ (e) $v + 11v + 4v - v$ (f) $90j^2 + 5j^2 - j^2$

(g) $h + 13h + 12h - 23h$ (h) $7u + 6u - 12u$ (i) $5g^2 + 9g^2 - 4g^2$

(j) $51e^3 + 29e^3 - 79e^3$ (k) $z - 5z + 7z$ (l) $31x - 35x - 6x$

Exercise 2

1. If $a = 4$ and $b = 5$, find the value of :-

(a) $a + b$ (b) $a - b$ (c) ab (d) $5a - 3b$

(e) $8b \div 4$ (f) $7a \div 2$ (g) $4ab \div 20$ (h) $ab \div 40$

2. For $w = 2$, $x = 3$, $y = 1$ and $z = 6$, calculate :-

(a) $2w + 3 + x$ (b) $1 + 2z - 2x$ (c) $5y + 2w$ (d) $30 - 5z$

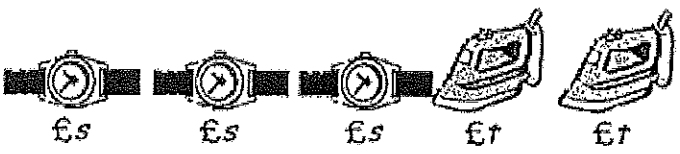
(e) $z - 3w + y$ (f) $w + 3x - y$ (g) $2wx - 2$ (h) $25 - 3yz$

(i) $2z + 4y - x$ (j) $2x - 4y + 2w$ (k) $\frac{1}{3}wz + x$ (l) $\frac{1}{4}zw - xy$

(m) $10 - 2z + y$ (n) $5 + 3yw - wzy$ (o) $2y - 5w + z$ (p) $72 - 2wxyz$

3. (a) Find an expression for the total cost of the items shown :-

(b) If $s = 10$ and $t = 20$, what is the total cost ?



4. Find the value of each expression below when $a = 2$, $b = 3$ and $c = 4$:-

(a) $a + b - c$ (b) $2a + 4b - 3c$ (c) $5b - 4c + a$

(d) $a^2 + b^2 + c^2$

MNU 3-15a: Having discussed ways to express problems or statements using mathematical language, I can construct and use appropriate methods to solve a range of simple equations

Exercise 1

1. Copy each equation and solve it to find the value of x :-

(a) $x + 7 = 12$ (b) $x + 12 = 14$ (c) $11 + x = 23$

(d) $8 - x = 3$ (e) $x - 2 = 5$ (f) $x - 12 = 14$

2. Copy and solve :-

(a) $2a = 10$ (b) $3y = 15$ (c) $9h = 81$

(d) $12p = 0$ (e) $5x = 75$ (f) $19w = 76$

Find the value of each variable by solving the equations :-

3. (a) $2x + 4 = 16$ (b) $3y + 1 = 13$ (c) $5y + 4 = 9$

(d) $8p - 1 = 23$ (e) $2x - 7 = 13$ (f) $9 + 2w = 15$

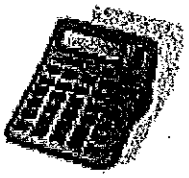
(g) $7c - 12 = 9$ (h) $14 - 5g = 4$ (i) $8 - 3e = 2$

(j) $8 + 4x = 0$ (k) $12z - 3 = 57$ (l) $8 - 2a = -2$

MNU 3-15b: I can create and evaluate a simple formula representing information contained in a diagram, problem or statement.

Exercise 1

1. Five calculators (c) are priced at £6 in total.



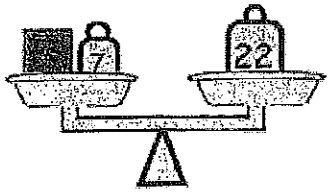
(a) Form an equation in c to show this.

(b) Solve the equation to find the cost of one calculator.

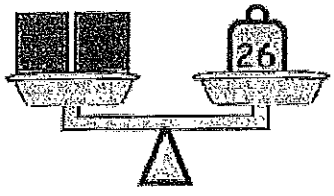
2. For each diagram below:- (i) Write an equation which describes the picture

(ii) Solve to find the value of x.

(a)



(b)



(c)

3. Gary and Bob weigh a total of 112 kilograms.
Gary weighs 61 kilograms.

(a) Make up an equation to show this information.

(b) Solve the equation to find Bob's weight.