Name: _____

Derivation of Expressions

Date:

Time: 45 minutes

Total marks available: 45

Total marks achieved: _____

Questions

Q1.

Dimitar has 20 sweets.
Pip also has 20 sweets.

Dimitar gives Pip *x* sweets.

Dimitar then eats 5 of his sweets.
Pip then eats half of her sweets.

Write expressions for the number of sweets Dimitar and Pip now have.

Dimitar ..... Pip .....

(Total for question = 3 marks)

Q2.

The length of a line is *x* centimetres.

Write down an expression, in terms of *x*, for the length of the line in millimetres.

.....

(Total for question = 1 mark)

Q3.

(a) Simplify $5f - f + 2f$

.....

(1)

(b) Simplify $2 \times m \times n \times 8$

.....

(1)

(c) Simplify $t^2 + t^2$

.....

(1)

(Total for question is 3 marks)

Q4.

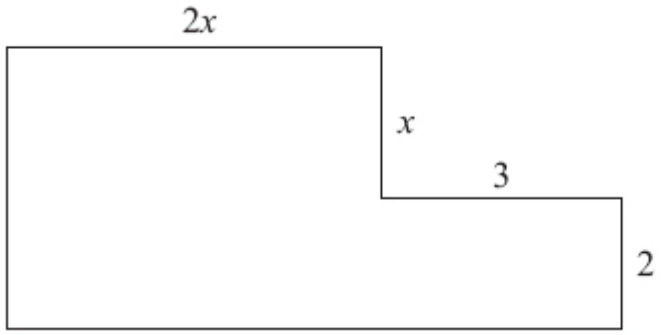


Diagram **NOT** accurately drawn

In the diagram, all measurements are given in centimetres.
All angles are right angles.

Show that the perimeter of the shape can be written as $2(3x + 5)$.

(Total for Question is 4 marks)

Q5.
The diagram shows **shape A**.
All the measurements are in centimetres.

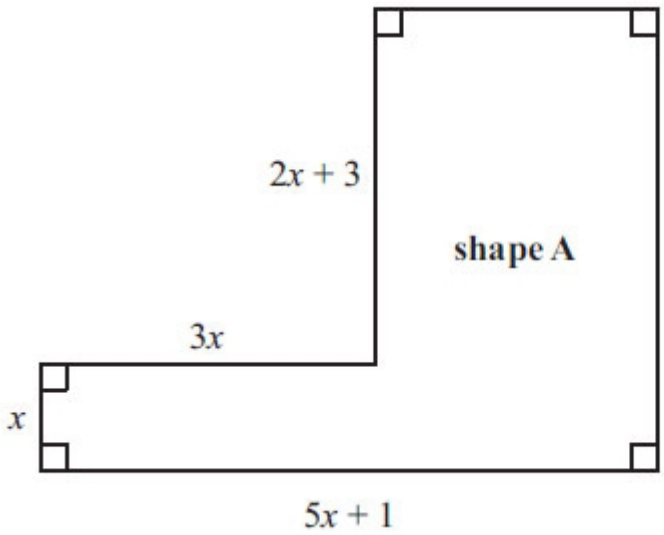


Diagram **NOT** accurately drawn

(a) Find an expression, in terms of *x*, for the perimeter of **shape A**.

. . . . . .

(3)

A square has the same perimeter as **shape A**.

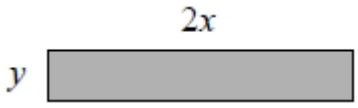
(b) Find an expression, in terms of *x*, for the length of one side of this square.

. . . . . .

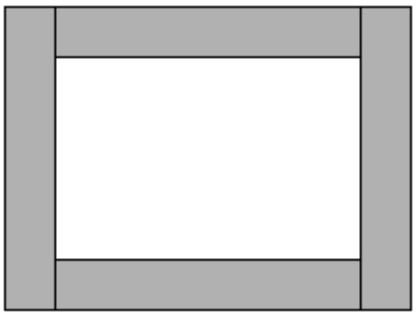
(1)

(Total for Question is 4 marks)

Q6.
Here is a rectangle made of card.



The measurements in the diagram are in centimetres. Lily fits four of these rectangles together to make a frame.



The perimeter of the inside of the frame is P cm.

(a) Show that $P = 8x - 4y$

(2)

Magda says,

"When x and y are whole numbers, P is always a multiple of 4."

(b) Is Magda correct?
You must give a reason for your answer.

.....

.....

(2)

(Total for question = 4 marks)

Q7.
Kumar has three boxes of counters A, B and C.

There are x counters in box A.
There are $(2x + 7)$ counters in box B.
There are $(3x - 4)$ counters in box C.

There is a total of 75 counters in the three boxes.

Work out the number of counters in box B.

.....

(Total for question = 4 marks)

Q8.

Redlands School sent *x* students to a revision day.
St Samuel's School sent twice as many students as Redlands School.
Francis Long School sent 7 fewer students than Redlands School.

Each student paid £15 for the revision day.
The students paid a total of £1155

Work out how many students were sent by each school to the revision day.
You must show all your working.

(Total for question = 5 marks)

Q9.

Asha and Lucy are selling pencils in a school shop.
They sell boxes of pencils and single pencils.

Asha sells 7 boxes of pencils and 22 single pencils.
Lucy sells 5 boxes of pencils and 2 single pencils.
Asha sells twice as many pencils as Lucy.

Work out how many pencils there are in a box.
You must show all your working.

.....

(Total for question = 4 marks)

Q10.

Dan has some marbles.
Ellie has twice as many marbles as Dan.
Frank has 15 marbles.

Dan, Ellie and Frank have a total of 63 marbles.

How many marbles does Dan have?

(Total for Question is 3 marks)

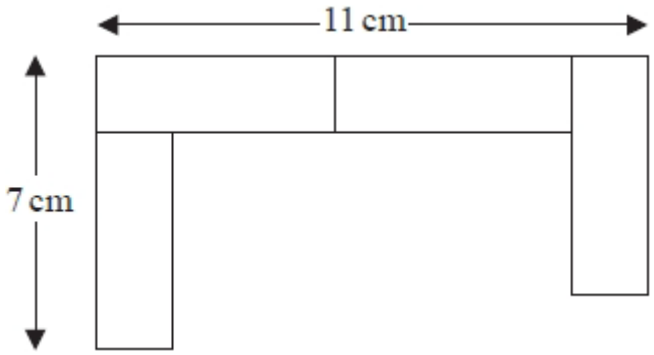
Q11.
There are *y* boats on a lake.
There are 7 people in each boat.

Write an expression, in terms of *y*, for the total number of people in the boats.

.....

(Total for question = 1 mark)

Q12.
A pattern is made using identical rectangular tiles.



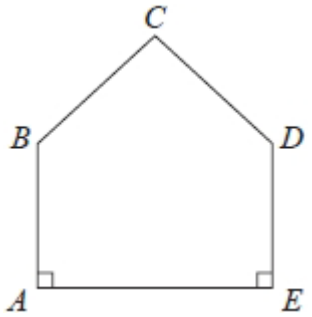
Find the total area of the pattern.

..... cm^2

(Total for question is 4 marks)

Q13.

The diagram shows a pentagon.
The pentagon has one line of symmetry.



$AE = 4x$
$AB = 2x + 1$
$BC = x + 2$

All these measurements are given in centimetres.

The perimeter of the pentagon is 18 cm.

(a) Show that $10x + 6 = 18$

(3)

(b) Find the value of x.

$x =$ .....

(2)

(Total for question = 5 marks)