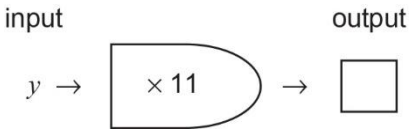
NAME

Non-calculator

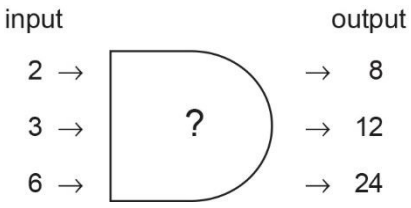
1 a Write an expression for the output of this function machine.



.....

(1 mark)

b Write down the rule for this function machine.

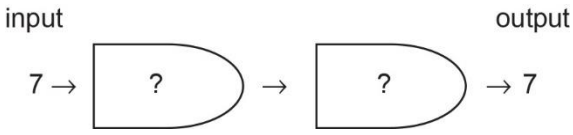


.....

(1 mark)

c Here is a two-step function machine.

An input of 7 gives an output of 7.



What could the functions be?

..... and .....

(1 mark)

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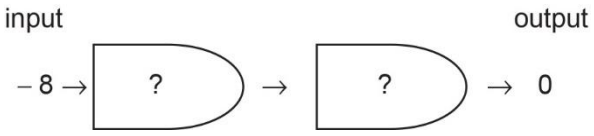
d Here is a two-step function machine.

An input of −8 gives an output of 0.



What could the functions be?

..... and .....

(1 mark)

2 Simplify

a $p + 5p - 3p$

.....

(1 mark)

b $2a + 3b - 4 - 5a + b$

.....

(2 marks)

3 a Expand

$4(3x + 2)$

.....

(1 mark)

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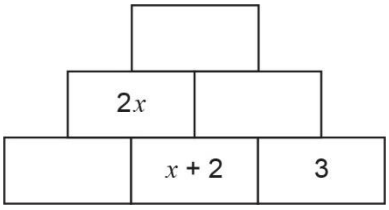
b Expand and simplify $5(2d - 3) + 3(d + 7)$

.....

(2 marks)

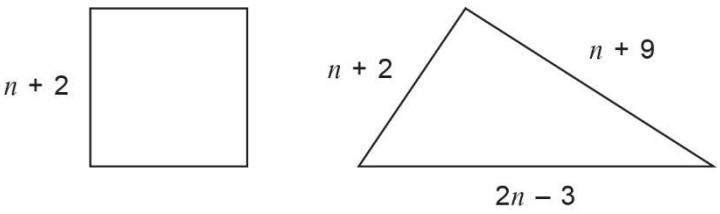
4 In this addition pyramid, each brick is the sum of the two bricks below it.

Complete the addition pyramid.



(2 marks)

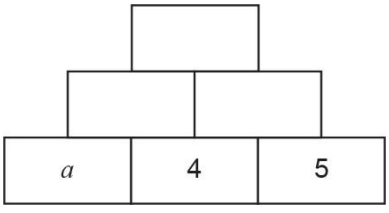
5 Show that this square and this triangle have the same perimeter.



(2 marks)

6 In the multiplication pyramid, each brick is the product of the two bricks below it.

Complete the multiplication pyramid.



(2 marks)

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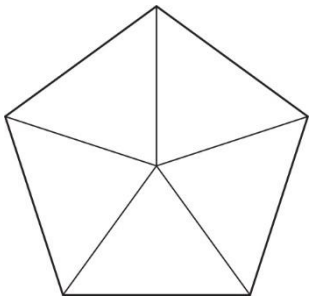
7 A regular pentagon is divided into five identical isosceles triangles.



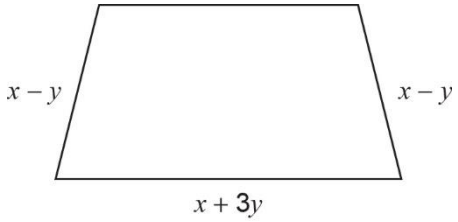
The area of the regular pentagon is B cm^2.

Write a formula for T, the area of one of the triangles.

……cm

(1 mark)

8 The lengths of three sides of the trapezium are as shown on the diagram.



The perimeter of the trapezium is $5x - 2y$ cm.

Find the length of the fourth side.

Write your answer in its simplest form.

……cm

(2 marks)

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9 A rectangle has length x cm.

The width of the rectangle is 3 cm less than its length.

The rectangle has perimeter p cm.

Write a formula for the perimeter of the rectangle.

Give your formula in its simplest form.

.....

(2 marks)

10 A shop is open for

p hours on each weekday from Monday to Friday

2 hours a day less on Saturday and Sunday.

Write an expression in its simplest form for the total number of hours the shop is open each week.

.....

(2 marks)

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Calculator

11 Simplify

a $3f \times 5$

……

(1 mark)

b $\frac{18x}{6}$

……

(1 mark)

12 The perimeter p cm of an equilateral triangle is given by the formula

$$p = 3c$$

where c is the length of one of the sides in centimetres.

Work out the perimeter when $c = 6.4$ cm

……cm

(1 mark)

13 In a pond, the number of fish (f) after k years is given by the formula

$$f = 800 - 73k$$

Work out the number of fish after 6 years.

……

(2 marks)

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14 A formula for the acceleration of a car, a m/s^2, is

$$a = \frac{v - u}{t}$$

where u m/s in the initial speed, v m/s is the final speed and t is the time taken in seconds.

Calculate the acceleration of a car when u = 13.9 m/s, v = 22.4 m/s and t = 25 seconds.

..... m/s^2

(2 marks)

Overall mark	**/30**

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