

A014 Expressions, formula and substitution

Q1.

(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)

Q2.

Complete this table of values.

n	$3n + 2$
12
.....	47

(Total for question is 3 marks)

Q3.

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)

Q4.

Here are five straight rods.



All measurements are in centimetres.

The total length of the five rods is L cm.

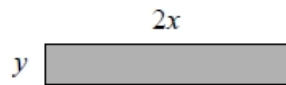
Find a formula for L in terms of a . Write your formula as simply as possible.

.....

(Total for question = 3 marks)

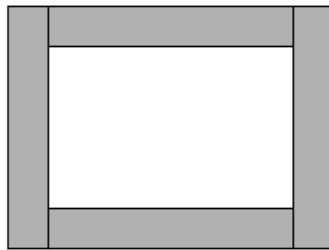
Q5.

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)

Q6.

Ben is n years old. Chloe is twice as old as Ben. Dan is five years younger than Ben. The total of Ben's age, Chloe's age and Dan's age is T years.

(a) Find a formula for T in terms of n .

.....
(3)

(b) In the table below, put a tick (\checkmark) in the box next to the identity.

$3h + 2 = 14$	<input type="checkbox"/>
$3a + 4b - 2c$	<input type="checkbox"/>
$A = \pi r^2$	<input type="checkbox"/>
$5m - 3m = 2m$	<input type="checkbox"/>
$x + 7 \leq 12$	<input type="checkbox"/>

(1)

(Total for question = 4 marks)

Q7.

(a) Simplify $3f \times 5g$

.....
(1)

(b) Simplify $t \times t$

.....
(1)

(c) Simplify $\frac{2n + 6n}{2}$

.....
(1)

(Total for question = 3 marks)

Q8.

(a) Simplify $5p - 3p + p$

.....
(1)

(b) Simplify $m^3 + m^3$

.....
(1)

(c) Simplify $10 + 3c + 5d - 7c + d$

.....
(2)

(Total for question = 4 marks)

Q9.

(a) Simplify $8x - 3x + 2x$

.....
(1)

(b) Simplify $4y \times 2y$

.....
(1)

(Total for question = 2 marks)

Q10.

a) Simplify $m^3 \times m^4$

.....
(1)

(b) Simplify $(5np^3)^3$

.....
(2)

(c) Simplify $\frac{32q^9r^4}{4q^3r}$

.....
(2)

(Total for question = 5 marks)

Q11.

(a) Simplify $2a \times 5b$

.....
(1)

(b) Simplify $3x + 2y + 5x - y$

.....
(2)

(Total for question = 3 marks)

Q12.

(a) Simplify $(p^2)^5$

.....
(1)

(b) Simplify $12x^7y^3 \div 6x^3y$

.....
(2)

(Total for question = 3 marks)

Q13.

A rule to change a UK shoe size to a European shoe size is

multiply the UK shoe size by 1.25 and then add 32

European shoe sizes are given as whole numbers. Katie's UK shoe size is 5

(a) Work out Katie's European shoe size.

.....
(2)

Gustav's European shoe size is 42

(b) Work out Gustav's UK shoe size.

.....
(2)

(Total for question = 4 marks)

Q14.

You can use this rule to work out the total cost, in pounds, of hiring a carpet cleaner.

Multiply the number of days by 7.8 and then add 12

Andy hires a carpet cleaner. The total cost is £82.20

(a) Work out the number of days Andy hires the carpet cleaner for.

..... days
(2)

Chloe hires a carpet cleaner for y days. The total cost is £ T .

(b) Write down a formula for T in terms of y .

.....
(2)

(Total for question = 4 marks)

Q15.

An estimate of the height, H metres, of a tall building can be found using the formula

$$H = 4f + 12$$

where the building is f floors high.

A tall building is 110 floors high. The real height of the building is 442 m.

Seb uses the formula to find an estimate of the height of this building.
He then finds the difference between his estimate and the real height.

Show that this difference is less than 5% of the real height.

(Total for question = 4 marks)