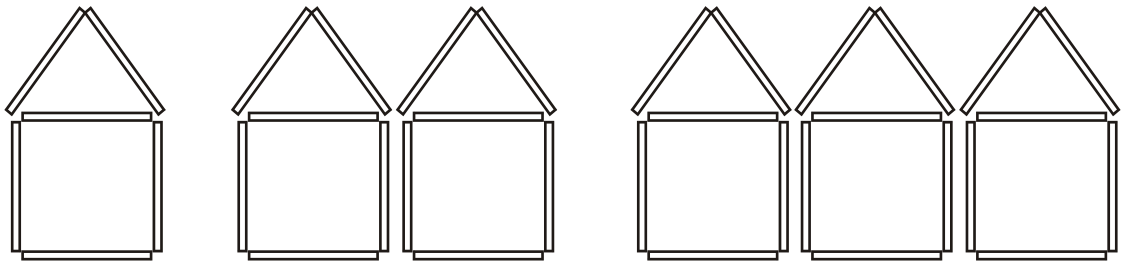
1. Here are some patterns made from matchsticks.



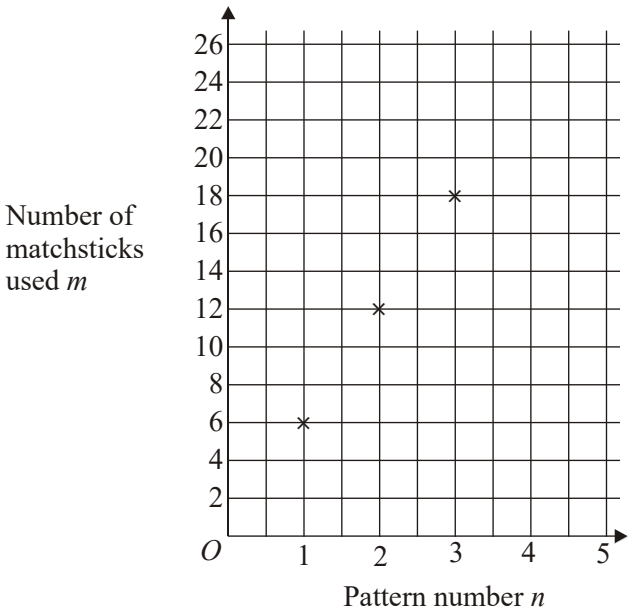
Pattern number 1 Pattern number 2 Pattern number 3

(a) Draw Pattern number 4, in the space below.

(1)

The graph shows the number of matchsticks m in pattern number n.

(b) Mark the point which shows the number of matchsticks used in Pattern number 4.



(1)

(c) How many matchsticks are used in Pattern number 10?

……

(1)

(d) Write down a formula for m in terms of n.

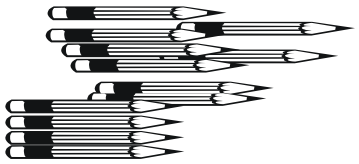
……

(2)
(Total 5 marks)

2. Lisa packs pencils in boxes.

She packs 12 pencils in each box.

Lisa packs x boxes of pencils.



(a) Write an expression, in terms of x, for the number of pencils Lisa packs.

.....

(1)

Lisa also packs pens in boxes.

She packs 10 pens into each box.

Lisa packs y boxes of pens.

(b) Write down an expression, in terms of x and y, for the **total** number of pens and pencils Lisa packs.

.....

(2)
(Total 3 marks)

3. This table is used to find numbers of rolls of insulation material needed for lofts of different floor areas.

Floor area of loft (A square feet)	Number of rolls (n)
300	6
350	7
400	8
450	9
500	10
550	11

The floor of a rectangular loft is 30 feet long and 15 feet wide.

(a) (i) Work out the floor area of this loft.

…… square feet

(ii) Write down the number of rolls of insulation material needed for this loft.

……..……

(3)

n is the number of rolls of insulation material needed for a loft with a floor area of A square feet.

(b) Express n in terms of A.

$n =$ ……

(2)
(Total 5 marks)

4. Jennifer made x cakes.
She put 4 sweets on top of each cake.

(a) Write down an expression, in terms of x, for the number of sweets she used.

……..

(1)

Paul made 3 more cakes than Jennifer.

(b) Write down an expression, in terms of x, for the number of cakes Paul made.

……..

(1)

Paul also put 4 sweets on each of his cakes.

(c) Write down an expression, in terms of x, for the number of sweets Paul used.

……..

(1)

(Total 3 marks)

5. Eggs are sold in boxes.
A small box holds 6 eggs.

Hina buys x small boxes of eggs.

(a) Write down, in terms of x, the total number of eggs in these small boxes.

.....

(1)

A large box holds 12 eggs.

Hina buys 4 less of the large boxes of eggs than the small boxes.

(b) Write down, in terms of x, the number of large boxes she buys.

.....

(1)

(c) Find, in terms of *x,* the total number of eggs in the **large** boxes that Hina buys.

.....

(1)

(d) Find, in terms of *x,* the total number of eggs that Hina buys. Give your answer in its simplest form.

.....

(2)
(Total 5 marks)

6. Eggs are sold in boxes.
A small box holds 6 eggs.
A large box holds 12 eggs.

Hina buys *x* small boxes of eggs.
Hina also buys 4 less of the large boxes of eggs than the small boxes.

(a) Find, in terms of *x*, the total number of eggs in the **large** boxes that Hina buys.

.....

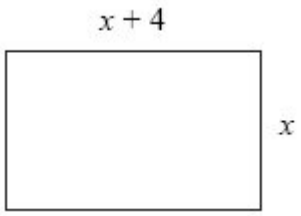
(1)

(b) Find, in terms of *x*, the total number of eggs that Hina buys.
Give your answer in its simplest form.

.....

(2)
(Total 3 marks)

7. The width of a rectangle is x centimetres.
The length of the rectangle is $(x + 4)$ centimetres.



(a) Find an expression, in terms of x, for the perimeter of the rectangle.
Give your expression in its simplest form.

……..

(2)

The perimeter of the rectangle is 54 centimetres.

(b) Work out the length of the rectangle.

……cm

(3)
(Total 5 marks)

8. The cost, in pounds, of hiring a car can be worked out using this rule.

Add 3 to the number of days' hire
Multiply your answer by 10

The cost of hiring a car for n days is C pounds.

Write down a formula for C in terms of n.

…….

(Total 3 marks)

9.

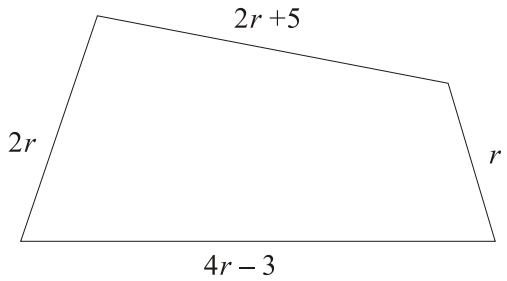


Diagram **NOT** accurately drawn

In the diagram, all measurements are in centimetres.

The lengths of the sides of the quadrilateral are

$2r + 5$
$2r$
$4r – 3$
r

(a) Find an expression, in terms of r, for the perimeter of the quadrilateral.
Give your expression in its simplest form.

.....

(2)

The perimeter of the quadrilateral is 65 cm.

(b) Work out the value of r.

r = ...

(2)
(Total 4 marks)

10. Here is a table for a two-stage number machine.
It subtracts 5 and then multiplies by 2

(a) Complete the table.

− 5 then × 2	
Input	**Output**
4	–2
2	.....
–3	.....

(2)

(b) The input is n.
Write down an expression, in terms of n, for the output.

.....

(1)

(c) The output is y.
Find an expression, in terms of y, for the input.

.....

(2)
(Total 5 marks)

11. Tom the plumber charges £35 for each hour he works at a job, plus £50.
The amount Tom charges, in pounds, can be worked out using this rule.

> Multiply the number of hours he works by 35
>
> Add 50 to your answer

Tom works for 3 hours at a job.

(a) Work out how much Tom charged.

£ .....

(2)

At his next job Tom charged the customer £260

(b) How many hours did Tom work?

..... hours

(3)

Tom works h hours at a job.
He charges P pounds.

(c) Write down a formula for P in terms of h.

.....

(3)
(Total 8 marks)

12. A cup of tea costs 80 pence.

(a) Write down an expression, in terms of x, for the cost, in pence, of x cups of tea.

..... pence

(1)

A cup of coffee costs 95 pence.

(b) Write down an expression, in terms of y, for the cost, in pence, of y cups of coffee.

..... pence

(1)

(c) Write down an expression, in terms of x and y, for the total cost, in pence, of x cups of tea and y cups of coffee.

..... pence

(2)
(Total 4 marks)

13. Tom the plumber charges £35 for each hour he works at a job, plus £50.
The amount Tom charges, in pounds, can be worked out using this rule.

Multiply the number of hours he works by 35 Add 50 to your answer

Tom charged a customer £260 for a job.

(a) How many hours did Tom work?

..... hours

(3)

Tom works h hours at a job.
He charges P pounds.

(b) Write down a formula for P in terms of h.

.....

(3)

(Total 6 marks)

14. Kate buys 2 lollies and 5 choc ices for £6.50
Pete buys 2 lollies and 3 choc ices for £4.30

Work out the cost of one lolly.
Give your answer in pence.

..... pence
(Total 3 marks)

15.

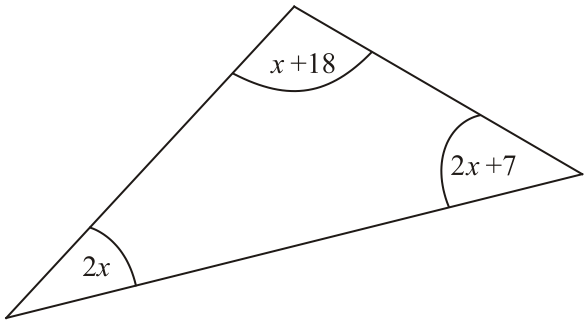


Diagram **NOT** accurately drawn

The sizes of the angles, in degrees, of the triangle are

$2x + 7$
$2x$
$x + 18$

(a) Use this information to write down an equation in terms of x.

.....

(2)

(b) Use your answer to part (a) to work out the value of x.

$x =$ .....

(2)
(Total 4 marks)

16. One cup costs £3

One plate costs £5

Write down an expression for the total cost, in pounds, of x cups and y plates.

……...

(Total 2 marks)

17. David buys some stamps.
Each stamp costs 25p.
The total cost of the stamps is £3

(a) Work out the number of stamps David buys.

.....

(2)

Adam, Barry and Charlie each buy some stamps.
Adam buys x stamps.
Barry buys three times as many stamps as Adam.

(b) Write down an expression, in terms of x, for the number of stamps Barry buys.

.....

(1)

Charlie buys 5 more stamps than Adam.

(c) Write down an expression, in terms of x, for the number of stamps Charlie buys.

.....

(1)
(Total 4 marks)

18. Compasses cost c pence each.
Rulers cost r pence each.

Write down an expression for the total cost, in pence, of 2 compasses and 4 rulers.

..... pence
(Total 2 marks)

19. (a) Simplify $4x + 3y - 2x + 5y$

.....
(2)

Compasses cost c pence each.
Rulers cost r pence each.

(b) Write down an expression for the total cost, in pence, of 2 compasses and 4 rulers.

..... pence
(2)
(Total 4 marks)

20. Pat plays a game with red cards and green cards.

Red cards are worth 5 points each.
Green cards are worth 3 points each.

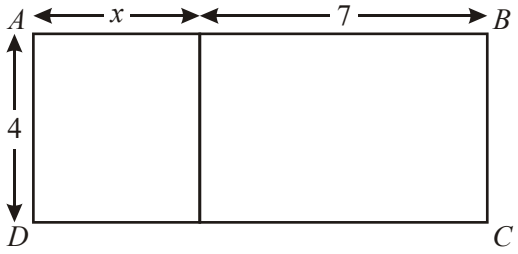
Pat has r red cards and g green cards.
His total number of points is N.

Write down, in terms of r and g, a formula for N.

……..

(Total 3 marks)

21. The diagram shows a rectangle $ABCD$.
The measurements on the diagram are in centimetres.



Write down an expression, in terms of x, for the area of the rectangle $ABCD$.

…… cm^2

(Total 2 marks)

22. Jessica is paid £7 for each hour that she works.
She works for y hours.

(a) Write down an expression, in terms of y, for the amount, in pounds (£), that Jessica is paid.

…….

(1)

Lucy is also paid £7 for each hour that she works.
She works for three times as many hours as Jessica.

(b) Write down an expression, in terms of y, for the amount, in pounds (£), that Lucy is paid.
Give your answer as simply as possible.

…….

(2)
(Total 3 marks)

23. Eggs are sold in boxes.
A small box holds 6 eggs.
A large box holds 12 eggs.

Hina buys x small boxes of eggs.
Hina also buys 4 less of the large boxes of eggs than the small boxes.

(a) Find, in terms of x, the total number of eggs in the **large** boxes that Hina buys.

.....

(1)

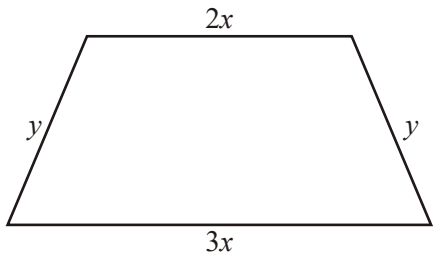
(b) Find, in terms of x, the total number of eggs that Hina buys.
Give your answer in its simplest form.

.....

(2)
(Total 3 marks)

24.

Diagram **NOT** accurately drawn



The diagram shows a trapezium.
All the lengths are in centimetres.
The perimeter of the trapezium is P cm.

Find a formula, in terms of x and y, for P.
Give your answer in its simplest form.

P =.....

(Total 2 marks)

25. A shop sells CDs for x pounds each.
Darren buys 8 of these CDs.

What is the expression, in terms of x, for the total cost of 8 CDs?

$8 + x$	x	$\frac{8}{x}$	$8x$	$\frac{x}{8}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

26. A can of cola costs x pence.
An ice cream costs y pence.
Atif buys 3 cans of cola and 2 ice creams.

Write down an expression, in terms of x and y, for the total cost, in pence.

.....

(Total 2 marks)

27. Linda buys 2 bags of toffees.
Each bag contains x toffees.

Simon buys 3 bags of chocolates.
Each bag contains y chocolates.

Write down an expression in terms of x and y for the **total** number of toffees and chocolates that Linda and Simon buy.

.....

(Total 2 marks)

28.

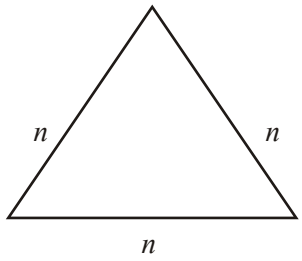


Diagram **NOT** accurately drawn

The perimeter of this equilateral triangle is P cm.
Each side of the triangle has a length of n cm.

(a) Write down a formula for P in terms of n.

.....

(2)

(b) Work out the value of P when $n = 6$

$P =$ .....

(2)
(Total 4 marks)

29. Sweets cost 5 pence each.
Shamonti buys x sweets.

What is the expression, in terms of x, for the total cost?

x	$\frac{x}{5}$	$x + 5$	$\frac{5}{x}$	$5x$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

30. Pens cost x pence each.
Pencils cost y pence each.

Rachael buys 2 pens and 5 pencils.

What is the expression, in terms of x and y, for the total cost?

$2x + 5y$	$x + y$	$5x + 2y$	$7xy$	$7(x + y)$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

31. Pens cost 10p each. Pencils cost 12p each.

What is an expression for the total cost, in pence, of x pens and y pencils?

$x + y$	$x = 10 + y = 12$	$12x + 10y$	$(10 + 12)xy$	$10x + 12y$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

32.

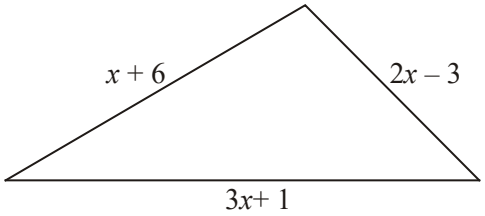


Diagram **NOT** accurately drawn

In the diagram, all measurements are in centimetres.

The lengths of the sides of the triangle are

$x + 6$
$2x – 3$
$3x + 1$

(a) Find an expression, in terms of x, for the perimeter of the triangle.

Give your expression in its simplest form.

.....

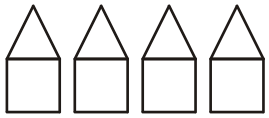
(2)

The perimeter of the triangle is 37 cm.

(b) Find the value of x.

x = ...

(2)
(Total 4 marks)

1. (a) 

B1 1

(b) Plotting (4, 24) 1
B1 ft from their matchsticks

(c) 60 1
B1 cao

(d) $m = 6n$ 2
B2 for $m = 6n$ *oe*
(B1 for 6n *oe or* m = *multiple of* n *except* m = n*)*

[5]

2. (a) $12x$ 1
B1 oe

(b) $12x + 10y$ 2

B2 oe ft from (a)
(B1 12x + multiple of y or 10y seen)
SC B1 for x = 12x + 10y OR y = 12x + 10y

[3]

3. (a) (i) 450 3

30×15

M1 for 30 × 15
A1 cao

(ii) 9

A1 ft from "450"

(b) $\frac{A}{50}$ 2

B2 $\frac{A}{50}$ *oe*
(B1 for 50n seen)

[5]

4. (a) $4x$ 1

B1 cao accept 4 × x

(b) $x + 3$ 1

B1 cao accept x × 3

(c) $4(x + 3)$ or
$4x + 12$ 1

B1 cao 4 (x + 3)

[3]

5. (a) $6x$ 1

B1 accept 6 × x, x6 oe

(b) $x - 4$ 1

B1 cao

(c) $12(x - 4)$ 1

1 for 12(x – 4) or 12x – 48 or 12 × x – 48 oe

(d) $18x - 48$ 2

M1 for " 6x" + "12(x – 4)" or "6x" + "12x – 48" oe
A1 ft 18x – 48, 2(9x – 24), 3 (6x – 16), 6 (3x – 8)

[5]

6. (a) $12(x - 4)$ 1

B1 for 12(x – 4) or 12x – 48 or 12 × x – 48 oe
x = 12 (x – 4) gets B0

(b) $18x - 48$ 2

M1 6x + "12(x – 4)" or 6x + "12x – 48"
A1 ft a linear expression 18x – 48, 2(9x – 24), 3(6x –16), 6(3x– 8)

[3]

7. (a) $4x + 8$ 2

$x + 4 + x + x + 4 + x$

M1 for attempting to add x, x + 4, x, x + 4 may be implied by 4x + a (a > 0)
A1 for 4x + 8 or 4(x + 2)

(b) 15.5 3

$4x + 8 = 54$
$4x = 46$
$x = 11.5$
Length = "11.5" + 4

M1 for "4x + 8" = 54
A1 cao for 11.5 seen
B1 ft for "11.5" + 4

[5]

8. $C = 10(n + 3)$ 3

B3 for C = 10(n + 3) oe such as C = (n + 3) × 10
(B2 for correct RHS or C = n + 3 × 10, C = 10n + 3 etc
B1 for C = some other linear expression in n or n + 3 × 10, 10n + 3 etc)
NB: C=n scores no marks

[3]

9. (a) $r + 2r + 5 + 2r + 4r – 3 = 9r + 2$ 2

M1 for intent to add the 4 terms, can be implied by sight of 9r
A1 cao

(b) $9r + 2 = 65 = 7$ 2

M1 ft for "9r + 2" = 65 or for correct inverse operations
A1 cao
NB: algebra seen in (b) can attract marks in (a) if (a) left blank

[4]

10. (a) –6, –16 2

B2 cao
(B1 for one correct value)

(b) $2(n – 5)$ 1

B1 oe eg 2n – 10; NB n^{th} = B1, n = B0

(c) "$2(n – 5)$" = y or ÷ 2 + 5 2
= $\frac{y+10}{2}$ or $\frac{y}{2} + 5$

M1 for "2(n – 5)" = y or ÷ 2 + 5
A1 for $\frac{y+10}{2}$ or $\frac{y}{2} + 5$ or $\frac{1}{2}(y + 10)$ or (y + 10) ÷ 2
(Sc B1 for ambiguous statements eg y + 10 ÷ 2)

[5]

11. (a) $3 \times 35 + 50$
= 155 2

M1 for 3 × 35 + 50 or digits 155 seen
A1 cao

(b) 260 – 50 = 210
210 ÷ 35 = 6 3

M1 for 260 – 50 or 210 seen.
M1 for "260 – 50" ÷ 35 or 210 ÷ 35
A1 cao
SC B1 for starting at a number between 100 and 170 and adding at least two 35's and showing a total between 230 and 290
or
For adding at least three 35's, perhaps with other numbers, and showing a total between 180 and 240 (or between 230 and 290 if 50 is included in the sum)

(c) $P = 35h + 50$ 3

B3 for $P = 35h + 50$ or $P = 35 \times h + 50$ oe
(B2 for correct RHS or $P = h + 50 \times 35$ or $P = 35h + k$ where k is numerical oe)
(B1 for P = some other linear expression in h, or $h + 50 \times 35$ or $35h$ seen)
NB: P = h scores no marks; ignore £ signs.
SC B2 for $h = \frac{P - 50}{35}$

[8]

12. (a) $80x$ 1

B1 for 80x (accept $80 \times x$, x80, $x \times 80$) seen

(b) $95y$ 1

B1 for 95y (accept $95 \times y$, y95, $y \times 95$) seen

(c) $80x + 95y$ 2

M1ft for adding "80x" and "95y" (algebraic expressions only)
A1 for 80x + 95y

[4]

13. (a) 260 – 50 = 210
210 ÷ 35 =
= 6 3

M1 for 260 – 50 or 210 seen.
M1 for "260 – 50" ÷ 35 or 210 ÷ 35
A1 cao

(b) $P = 35h + 50$ 3

B3 for $P = 35h + 50$ or $P = 35 \times h + 50$ oe

(B2 for correct RHS or $P = h + 50 \times 35$ or $P = 35h + k$ where k is numerical oe)

(B1 for P = some other linear expression in h, or $h + 50 \times 35$ or $35h$ seen)

NB: P = h scores no marks; ignore £ signs.

SC B2 for $h = \dfrac{P - 50}{35}$

[6]

14. $650 - 430 = 220$
1 choc ice costs 110p
$650 - 5 \times 110 = 100$p
$= 50$ 3

M1 for 650 – 430 or 220 or 110 oe seen

M1 for $650 - 5 \times \dfrac{'220'}{2}$ *or* $430 - 3 \times \dfrac{'220'}{2}$ *oe*

A1 for 50p or £0.50 or £0.5

Alternative scheme
2x + 5y = 650
2x + 3y = 430 oe
M1 for subtracting two simultaneous equations to eliminate x (lollies)(2 or 3 terms correct)
M1 for 650 – 5 × 'y' or 430 – 3 × 'y' oe
A1 for 50p or £0.50 or £0.5

Alternative scheme
M1 for 3× (2x + 5y = 650) evaluated and 5 × (2x + 3y = 430) evaluated oe (5 or 6 terms correct)
M1 for subtraction of equations to eliminate y (choc ices) (2 or 3 terms correct ft)
A1 for 50p or £0.50 or £0.5

[3]

15. (a) $(x + 18) + 2x + (2x + 7) = 180$
Equation 2

B2 for (x + 18) + 2x+ (2x + 7) = 180 oe

(B1 for (x + 18) + 2x + (2x + 7))

(b) $5x + 25 = 180$
$5x = 155 = 31$ 2

M1 for simplifying to at least 5x + 25 = 180 or 360 (may be earned in (a))
A1 for x = 31

[4]

16. $3x + 5y$ 2

B2 for 3x + 5y oe
(B1 for 3x or 5y oe)

[2]

17. (a) $300 \div 25$
12 2

M1 for 25 + 25 + 25 + ... or "3" ÷ 25 or £1 = 4 oe
A1 for 12 cao

(b) $3x$ 1

B1 for 3x or 3 × x

(c) $x + 5$ 1

B1 for x + 5 cao

[4]

18. $2c + 4r$ 2

B2 for 2c +4r oe
[B1 for 2c or 4r oe seen]
Ignore any Left Hand Side = 2c + 4r
{Note: ignore units or use of 'p'}

[2]

19. (a) $2x + 8y$ 2

B2 for 2x + 8y oe
[B1 for 2x or 8y seen]
{Note: –8y seen with no working gets B0
4x + 2x = 6x gets B0}

(b) $2c + 4r$ 2

B2 for 2c + 4r oe
[B1 for 2c or 4r or seen]
Ignore any Left Hand Side = 2c + 4r
{Note: ignore units or use of 'p'}

[4]

20. $N = 5r + 3g$ 3

B1 for 5r or 3g
B1 for 5r + 3g or N = an algebraic linear expression in r and g
B1 for N = 5r + 3g [SC B2 for N = 3r + 5g]

[3]

21. $4x + 28$
or $4(x + 7)$ 2

B2
(B1 for 4 × x, 4 × x + 7 or x + 7 × 4 if not contradicted)

[2]

22. (a) $7y$ 1

B1 for 7y oe

(b) $21y$ 2
"$7y$"× 3

M1 for"7y"× 3
A1 for 21y or y21

[3]

23. (a) $12(x - 4)$ 1

B1 for 12(x – 4) or 12x – 48 or 12 × x – 48 oe

(b) $18x - 48$ 2

M1 6x + "12(x – 4)" or 6x + "12x – 48" oe
A1 ft 18x – 48, 2(9x – 24), 3(6x – 16), 6(3x – 8)

[3]

24. P = $2x + y + 3x + y$
P = $5x + 2y$ 2

M1 for $2x + y + 3x + y$
A1 cao

[2]

25. D

[1]

26. $3x + 2y$ oe 2

B2 for $3x + 2y$ oe (accept x3 + y2 or 3 × x + 2 × y, etc. or x + x + x + y + y)
[B1 for 3x or 2y oe (accept x3 or 3 × x or y2 or 2 × y etc.) or x + x + x or y + y]

[2]

27. $2x + 3y$ 2

B2 for $2x + 3y$ oe seen (ignore any LHS = 2x + 3y)
(B1 for 2x or 3y oe)

[2]

28. (a) $P = 3n$ 2

B2 for P = 3n oe
(B1 for P = kn oe) or 3n (oe) seen)
***Note** n + 3; P + n + n + n oe gets B0*

(b) 18 2

M1 for correct substitution in their formula
A1 cao

[4]

29. E

[1]

30. A

[1]

31. E

[1]

32. (a) $2x - 3 + x + 6 + 3x + 1$
$6x + 4$ 2

M1 for $2x - 3 + x + 6 + 3x + 1$ or $6x + k$ seen
A1 for $6x + 4$, condone $P = 6x + 4$ but not $x = 6x + 4$ or $0 = 6x + 4$

(b) $6x + 4 = 37$
$6x = 33$
$x = 5.5$
5.5 2

M1 for "$6x + 4$" = 37, must be 3 term linear equation with coefficient of $x \neq 1$
A1 for 5.5, $\frac{11}{2}, 5\frac{1}{2}$ oe or ft for their "$6x + 4$" provided x is positive.
OR
M1 for a correct 2 stage numerical process to find x
A1 for 5.5, $\frac{11}{2}, 5\frac{1}{2}$ oe or ft for their "$6x + 4$" provided x is positive.
T&I Allow 2 marks for 5.5oe , otherwise 0
(SC B1 "$x + k = 37$" or "$kx = 37$")
NB Do not award marks in (a) for $6x + 4$ in (b)

[4]

1. Few marks were lost in the first three parts but only stronger candidates had the knowledge of algebra needed for the formula in part (d), for which $m \times n$, $m = n$ and $n + 6$ were popular wrong answers.

2. **Paper 1**

Only the strongest Foundation candidates can realistically be expected to have the competence in basic algebra needed for a question of this type and so it proved. Thus, the answers $x = 12$ and $x + 12$ were often given for part (a), with $y = 10$ and $x \times y = 22$ popular for part (b). Every effort was, however, made to reward genuine evidence of understanding. For example, in part (b), one mark was awarded for the appearance of $10y$ in the expression $12x \times 10y$.

Paper 3

This question was well answered by most candidates; the only common error in part (a) was $12 + x$, given by a minority of candidates. There were many correct solutions in part (b), but a significant number of candidates spoilt their final answer by incorrectly simplifying further, sometimes giving the response $22xy$.

3. Part (a) was answered very well although a surprising number of candidates could not multiply 30 by 15 correctly. Candidates were less successful in part (b) and a variety of incorrect responses involving the letters A and n were seen.

4. Parts (a) and (b) were reasonably well answered; some candidates reversed the operations and produced $x + 4$ for (a) and $3x$ for (b). Part (c) was not well attempted, even as a possible follow-through from part (b); a common error was $4x + 3$ or $x + 3 \times 4$. It was disappointing to see some candidates attempt to write down a formula rather than an expression, the worst possible case of which was when they wrote statements such as $x = 4x$.

5. Most candidates achieved no success. Few understood the requirements of the question and numerical answers were common, although a minority answered the first part correctly.

6. In recent years candidates have become far better at writing algebraic expressions for situations given. But not this year, as there were rarely any attempts at this question that attracted marks. There were many numerical answers. Some attempts were recognisable, but were frequently ambiguous, such as $x - 4 \times 12$ or $12 \times x - 4$.

7. Specification A

Foundation Tier

Only a small minority of candidates (8%) were able to make a reasonable attempt at the question and show algebra, which could be awarded any credit. Many candidates did not attempt the question. Others mistakenly, gave expressions for the area of the rectangle or for half the perimeter. Even fewer of the answers seen to part (b) of the question gained any credit. In the rare event the correct answer was seen (2%), evidence suggested that a trial and improvement rather than algebraic method had been used. In part (a) 92% gained no marks and in part (b) 95% gained no marks.

Intermediate Tier

This question was a good discriminator with only the more able candidates obtaining a correct expression in part (a). Confusion between area and perimeter was widespread and even when candidates did attempt to find an expression for the perimeter some only added together the two given sides. Many did add the four sides but attempts to simplify the resulting expression often failed because of poor algebra skills. Common errors included $x + x = x^2$ and $x + 4 = 4x$. Candidates who were successful in part (a) tended to find the correct value of x in part (b) though they sometimes forgot to add on 4 in order to find the length of the rectangle. Some candidates attempted to use incorrect expressions from part (a) to solve part (b) but many started again. Few of these candidates used algebra but many correctly subtracted 8 from 54 and then divided by 4 to get 11.5. A common error was to divide 54 by 4.

Specification B

Foundation Tier

Expressing the perimeter of the rectangle in terms of the variable x and then simplifying the expression proved to be beyond most candidates. There was evidence of an attempt to write the perimeter as $x + x + 4 + x + x + 4$ which gained the first mark but what followed in the simplification was often incorrect.
Given that the perimeter was 54cm an equation needed to be set up and solved and ideally it looked like $4x + 8 = 54$. In reality many began again and attempted to solve the problem in an arithmetical way. The success rate was just 5%.

Intermediate Tier

Candidates often scored one mark in part (a) for an attempt to add the four sides of the rectangle; however simplification to give a correct algebraic expression was not common. $2x + 4$, $x^4 + 8$ and $x^2 + 4x$ (area) were the best of the incorrect answers offered. When a correct expression was found this often led to correct working in part (b), although many candidates found the value of x (11.5) and failed to find the length of the rectangle, possibly a result of not having carefully read the question. A common wrong answer was 13.5 (54 ÷ 4); this only gained marks following through from a perimeter of $4x$ in part (a). Many candidates used their incorrect answers to part (a) in an attempt to find the value of x; however many started again with varying success, usually employing arithmetic rather than algebraic methods.

8. It was encouraging to find most candidates making an effort to give an algebraic response. The most common incorrect answer was $C = n + 3 \times 10$. More able candidate inserted brackets to remove the ambiguity. A few candidates misread the question and failed to give the answer as a formula for C in terms of n.

9. A good proportion of candidates made a reasonable attempt at part (a). Most understood that they needed to add the lengths of the four sides to find the perimeter but there was evidence of much confusion over the collection of like terms. It was not uncommon to see '$2r + 5 = 7r$' and terms in r^4 abounded. Surprisingly, many of the more successful candidates did not simplify the numerical part of the expression and gave an answer of '$9r + 5 – 3$'. Possible method marks were often lost when candidates did not write down the sum of the four sides before simplifying the expression. In part (b), many candidates failed to identify that they needed to equate the expression found in part (a) to 65. Many started again or carried out numerical trials.

10. Part (a) was usually well answered, with 8 and 13 being common incorrect answers. Most candidates understood the rule in part (b), but wrote their answer in an ambiguous manner such as $n –5 \times 2$, thereby failing to get the mark. There was clear evidence of flow diagrams or inverse operations in part (c), but candidates had difficulty in expressing these in algebraic terms. Sign errors and use of the wrong variable were common mistakes.

11. The first part of this question was well answered with the great majority of candidates scoring both marks. Candidates scoring no marks in this part had usually failed to add the £50 and gave an answer of £105.

Little working was shown in the working space for part (b) so candidates usually scored either 3 marks or 0 marks. Of those who gained no marks, many had given either 5 or 7 as their answer. Those candidates might have scored some marks for method had they tried to write it down on paper. Of those candidates who employed a method involving repeated addition very few were successful, usually again because they failed to take account of the £50.

Part (c) discriminated well between candidates who had some grasp of how to construct an algebraic formula at this level and those who didn't. Whilst candidates who gave a linear expression in h gained some credit there were many candidates whose answers included the term "p x h". Only rarely did candidates gain all the marks available here. A considerable number of candidates made no attempt at this part of the question.

12. Most candidates attempted this question but many were unsuccessful. The answers given were very often equations, e.g. $x = 80x$, instead of expressions. The most common incorrect responses were $x = 80$ in part (a) and $y = 95y$ in part (b) followed by $x + y = 175$ in part (c). Even candidates with some idea often included brackets and multiplication signs in otherwise correct expressions in part (c).

13. In part (a) many candidates fully understood the processes required in working backwards, and fully completed this question. Common errors included correct evaluations of (260-50)/35 with the addition of 1 to the answer, or the division of 260 by 35 as their first step. Some trial and improvement methods were seen, which gained no credit unless successful. It was disappointing to see some candidates leave unrealistic answers for marking, without realising they must be wrong. In contrast part (b) resulted in few fully correct answers. A few got P and h mixed up, and some gave the equation in the form $h=$. There were ambiguous answers with poor algebra, and some who gave their answer as an expression rather than a formula.

14. Most candidates did this question well, setting it out as a simple calculation rather than using a standard algebraic approach. A significant number of candidates gave their final answer as simply 110, the price of a choc ice. The most common incorrect method was to divide £6.50 by 7 or £4.30 by 5.

Many of those candidates who adopted an algebraic approach were able to eliminating the x from their equations. The workings for this were, on the whole, methodical and neat with a majority producing the correct answer.

Relatively few candidates attempted this question by trial and improvement.

15. This was generally well answered, with most candidates almost automatically giving a simplified left hand side of a correct equation. A few candidates set the right hand side = 360. In addition there was a minority of students who either overlooked or misunderstood the need to produce an equation and left the answer to part (a) as an expression. Some of these candidates went on to solve the correct equation but others set $5x + 25 = 0$, which is clearly nonsensical.

16. Most candidates were not awarded either of the marks available in this question. Incorrect answers in the form "8", "$8xy$" and "$x + y$" were rarely preceded by any correct or partially correct expressions and so could not be given any credit.

17. Part (a) was answered very well. Many candidates worked out that 4 stamps could be bought for £1 so therefore 12 could be bought for £3 and some showed division of 300 by 25. Some made simple mistakes such as 5 stamps for £1, leading to an answer of 15, or 4 for £1, 8 for £2 so 16 for £3. Common incorrect methods were $25 \div 3$ and 25×3. Part (b) was answered less well but nevertheless more than half of the candidates were able to give the correct expression. A common incorrect answer was x^3. Some candidates, not appreciating that an expression was required, wrote $x = 3x$ which gained no credit. In part (c) the correct answer was seen less often. Many incorrect expressions had 5 being multiplied by x rather than added to it and some candidates added 5 to Barry's amount rather than to Adam's amount.

18. Many candidates gained at least one mark in this question for quoting either $2c$ or $4r$ or their equivalences. However $c^2 + r^4$ and $6cr$ were common mistakes.

$2c = c^2$ showing a basic misconception was also seen.

19. Part (a) was answered very well by most candidates. For some, the signs caused a problem with $2x - 8y$ being the most common incorrect answer. Most candidates were also successful in part (b). Some, though, wrote down $2c + 4r$ in their working and then made this equal to $6cr$, or even $8cr$, and lost a mark. A few candidates gave the answer as $c^2 + r^4$. Many candidates did not know the difference between an expression and an equation but they were not penalised for this.

20. This was surprisingly and pleasingly well done by many candidates. Even the weakest often realised that a linear expression in r and g was required , and hence earned 1 mark for $N = r + g$; which was the most common error. Completely correct answers were often seen albeit often in an unusual form; e.g. $N = r \times 5 + g \times 3$.

21. There were very few fully correct solutions to this question. Often candidates started well, realising that the area was equal to the length of $x + 7$ multiplied by the width of 4, but then finding difficulty in expressing their answer algebraically. Answers of $x + 7 \times 4$ or $4\ x \times + 7$ or $x + 28$ or $28x$ or $11x$ were commonplace. Many candidates tried to find a numerical answer by giving x a value (often 3 or 4) indicating a lack of appreciation of the demands of the question.

22. Part (a) was done very well with just under 70% giving a correct answer. Inclusion of a £ sign was condoned here. Answers of $y = 7$ and $y + 7$ were the usual errors.
Full marks were gained less often in part (b), many (52%) scoring one mark for an answer of $3 \times 7y$, $3 \times 7 \times y$, $3(7y)$ or equivalent but only 6% continued their solution to work out 3×7 to give an answer of $21y$.

23. Very few candidates were able to derive a correct expression in part (a), near misses included $x - 4 \times 12$ but even this was rare. Many candidates attempted to find a numerical answer and consequently failed in part (b). Some, more able candidates, offered the solution to part (b) in part (a) and then became confused when attempting part (b).

24. Many candidates clearly understood the demands of the question but lost marks by simplifying $y + y$ as y^2 and even $2x + 3x$ as $6x^2$. one mark was awarded if this method was shown, unfortunately many candidates lost both marks by merely giving an answer of $5x+y^2$ without any explanation. Answers of$10xy$ and $5x2y$ were also not uncommon.

25. No Report available for this question.

26. It was very pleasing to see so many candidates, of all levels of attainment, deriving correct algebraic expressions.

$3^x + 2^y$ and $x^3 + y^2$ were the most common errors made together with the predictable mistake of attempting to simplify $3x + 2y$ to give $5xy$.

27. It was pleasing to see so many candidates scoring full marks for a correct expression of $2x + 3y$, although a significant number equated this to $5xy$ and consequently lost one mark.

Weaker candidates often picked up a mark for sight of either $2x$ or $3y$, but some just wrote $x + y$ or xy and gained no marks. Any attempt to

28. There were many and varied responses to this question. Only 29% obtained a fully correct solution to part (a) with $P = n^3$ or $n \times n \times n$ being a common incorrect response. It was also common to $P + n + n + n$ which obtained no marks as it was not a formula though if $n + n + n$ was seen on its own one mark was awarded. In part (b) candidates were more successful with 57% obtaining both marks and a further 11% gaining 1 mark for using their formula correctly.

29. No Report available for this question.

30. No Report available for this question.

31. No Report available for this question.

32. **Foundation**

A significant number of candidates were able to score at least 1 mark in this question.

In part (a), only the best candidates were able to add and simplify the three expressions to get the correct perimeter for the triangle.

Common errors include: not recognizing that the coefficient of x by itself is 1, so that $x + 2x + 3x$ was simplified to $5x$; ignoring the negative sign so that $(+6) + (–3) + (+1)$ was simplified to 10; adding the constant terms to the terms in x, so that e.g. $6x + 4$ was simplified to $10x$; incomplete simplification (usually to $6x + 7 – 3$); unnecessary division by 2, so that $6x + 4$ was the simplified to $3x + 2$.

In part (b), few candidates put the expression they obtained in part (a) to form an equation in x. Of those that did, many had difficulty in dividing 33 by 6. A significant number of candidates used trial and improvement in the diagram to arrive at the correct answer for this part.

Higher

Many candidates were able to reach a correct simplified answer for a question that has now become common. Some candidates did not know the difference between a formula, an expression and an equation. Answers to part (a) of the form $P = 6x + 4$ (a formula) or $37 = 6x + 4$ (the start of part (b)) were not penalised, but $0 = 6x + 4$, $180 = 6x + 4$ and $x = 6x + 4$ all were.

Answers to part (b) were again marred by a lack of arithmetical skill.

The main stopping block being the division of 33 by 6, which often yielded 5.3 and where answers of 5 remainder 3 were not considered acceptable. Most candidates knew that they had to apply their answer to part (a) and set it equal to 37. Some used no algebra at all but showed a process that was clearly equivalent to subtracting 4 from 37 and the dividing the answer by 6. They got full marks if 5.5 or equivalent was obtained