1. Work out:

a) 2019 – 567

$$\begin{array}{r} {}^{1}\not{2}{}^{9}\not{0}{}^{1}19 \\ 567 \\ \hline 1452 \end{array}$$

M1 if at most one error in working

Answer: 1452 [2]

b) 67 × 89

×	60	7
80	4800	560
9	540	63

M1 if at most one error in working

Answer: 5963 [2]

c) 81.9 ÷ 6

$$\begin{array}{r} 13.65 \\ \hline 6 \overline{)\,8^{2}1.{}^{3}9^{3}0} \end{array}$$

M1 if at most one error in working

Answer: 13.65 [2]

d) 17.4 + 8.78

$$\begin{array}{r} 17.40 \\ +\ 8.78 \\ \hline 26.18 \\ {\scriptstyle 1\ \ 1\ \ \ \ } \end{array}$$

M1 if at most one error in working

Answer: 26.18 [2]

Page total: 8

2. Fill in the missing numbers in these sequences:

a) 15 , 22 , 29 , $\underline{36}$, 43 , $\underline{50}$ [2]

(1) (1)

b) 9 , 5 , 1 , $\underline{-3}$, $\underline{-7}$ [2]

(1) (1)

c) 96 , -48 , 24 , -12 , $\underline{6}$, $\underline{-3}$ [2]

(1) (1)

3. Fill in the blanks to make the calculation correct.

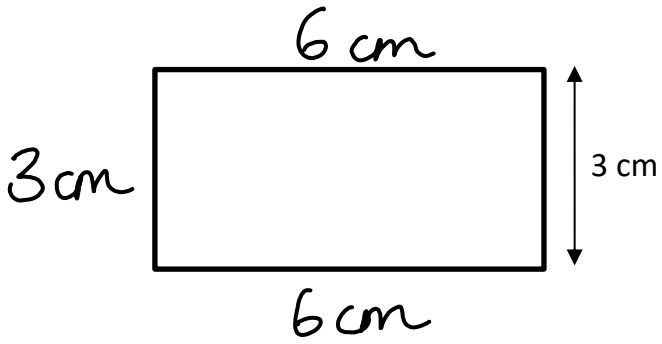
a) $18 - 6 + 7 =$ 19 [1]

b) $21 - ($ 4 $\times 3) = 9$ [1]

c) $16 - (-3)^2 =$ 7 [1]

Page total: 9

4. The perimeter of the rectangle below is 18 cm.



a) Find the width of the rectangle.

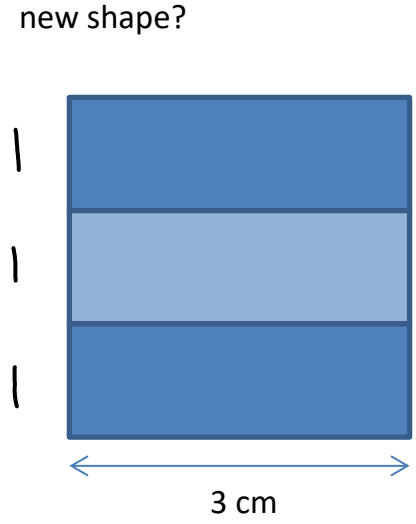
Answer: 6 cm [1]

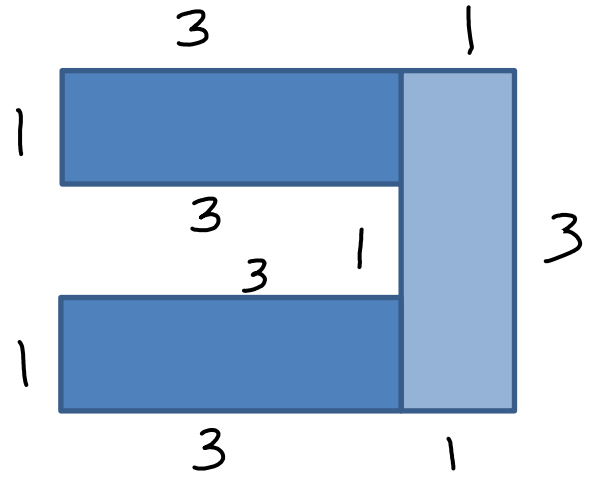
b) Find the area of the rectangle.

3 x 6

Answer: 18 cm^2 [1]

c) A square with sides of length 3 cm is divided into three identically sized rectangles. These are then arranged as shown. What is the perimeter of the new shape?



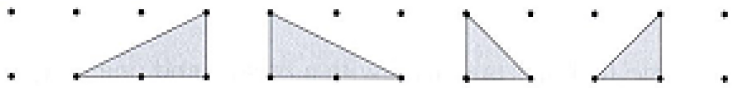


Answer: 20 [2]

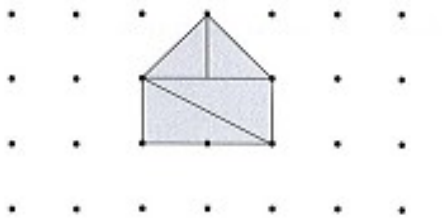
Page total: 4

(M1) for evidence of width of 1

5. The diagram below shows 4 triangular pieces of card.

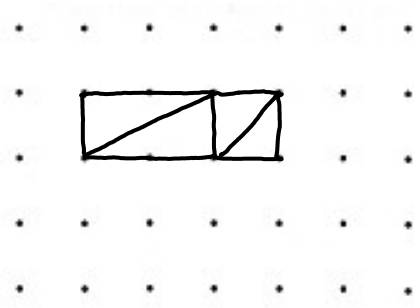


The pieces can be put together to form geometric shapes. The cards can be turned upside down or rotated if necessary. On the grid below the 4 pieces have been put together to make a pentagon.



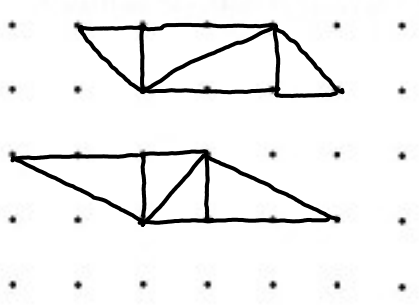
On each grid below draw a diagram to show how all 4 pieces of card could be put together to form the named shape.

a) A rectangle



(or equivalent) [1]

b) A parallelogram that is not a rectangle



[2]

(or equivalent to either of the above)

6.

a) Round 649 to the nearest 100

Answer: 600 [1]

b) Round 832 to the nearest 10

Answer: 830 [1]

c) A number has been rounded to the nearest 10 to give 370. What is the smallest whole number possible?

Answer: 365 [1]

7.

a) Calculate $0.4 + \frac{1}{4} + \frac{27}{100}$

$0.4 + 0.25 + 0.27$ (m1)

$$\begin{array}{r} 0.40 \\ + \ 0.25 \\ + \ 0.27 \\ \hline 0.92 \\ {\scriptstyle 1} \end{array}$$

or (m1) for $\frac{40}{100} + \frac{25}{100} + \frac{27}{100}$

Answer: 0.92 [2]

b) Write $\frac{51}{60}$ as a decimal

$\frac{51}{60} = \frac{17}{20} = \frac{85}{100}$

Answer: 0.85 [2]

Page total: 7

(m1) for sight of $\frac{17}{20}$ or $\frac{8.5}{10}$ or $\frac{85}{100}$

8. Find:

a) One third of £120

Answer: £ 40 [1]

b) 40% of £728

10% = £72.80 (m1)

72.80 x 4

Answer: £ 291.20 [2]

(or (m1) for finding $\frac{1}{5}$ of £728 = £145.60)

9. A sleeper train travels from London to Glasgow. The train departs at 11:28 pm and arrives at 06:53 am.

a) How long does the journey take?

(1) (1)

Answer: 7 hours 25 minutes [2]

b) A different train travels from London to Edinburgh at constant speed. The journey takes 3 hours and 30 minutes and the distance travelled is 420 miles. Calculate the speed of the train.

$\text{speed} = \frac{\text{distance}}{\text{time}} = \frac{420}{3.5} = \frac{840}{7} = 120$

Answer: 120 mph [2]

(m1) for 420 ÷ 3.5 (or equivalent)

Page total: 7

10. You are given the following five numbers: 34, 21, 35, 42, 28

a) Find the mean of these five numbers.

$$\text{mean} = \frac{160}{5} = 32$$

Answer: 32 [1]

b) Find the median for these five numbers.

21 28 (34) 35 42

Answer: 34 [1]

c) Find the range of these five numbers.

$42 - 21 = 21$

Answer: 21 [1]

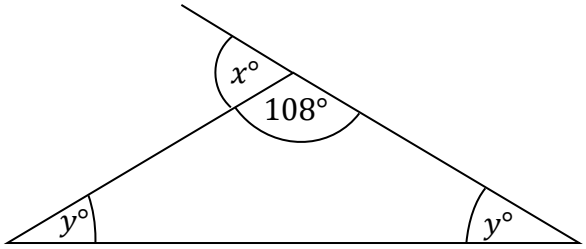
d) A sixth number is added to the list and the mean changes to 33.
Find what this sixth number was.

Total $= 33 \times 6 = 198$ (M1)

$198 - 160 = 38$

Answer: 38 [2]

11. The diagram shows a triangle and a line. The two angles marked $y°$ are equal.



a) Work out the value of x

180 − 108

Answer: 72 [1]

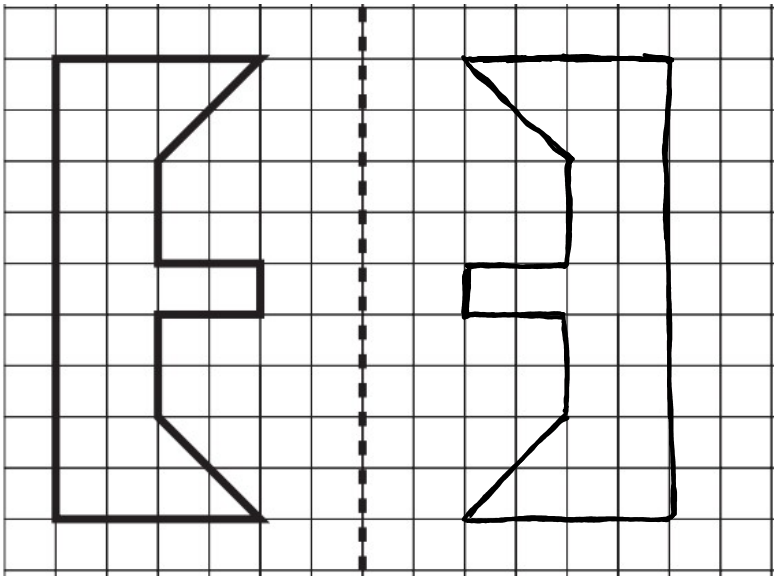
b) Work out the value of y

(180 − 108) ÷ 2 = 72 ÷ 2

(M1) for halving

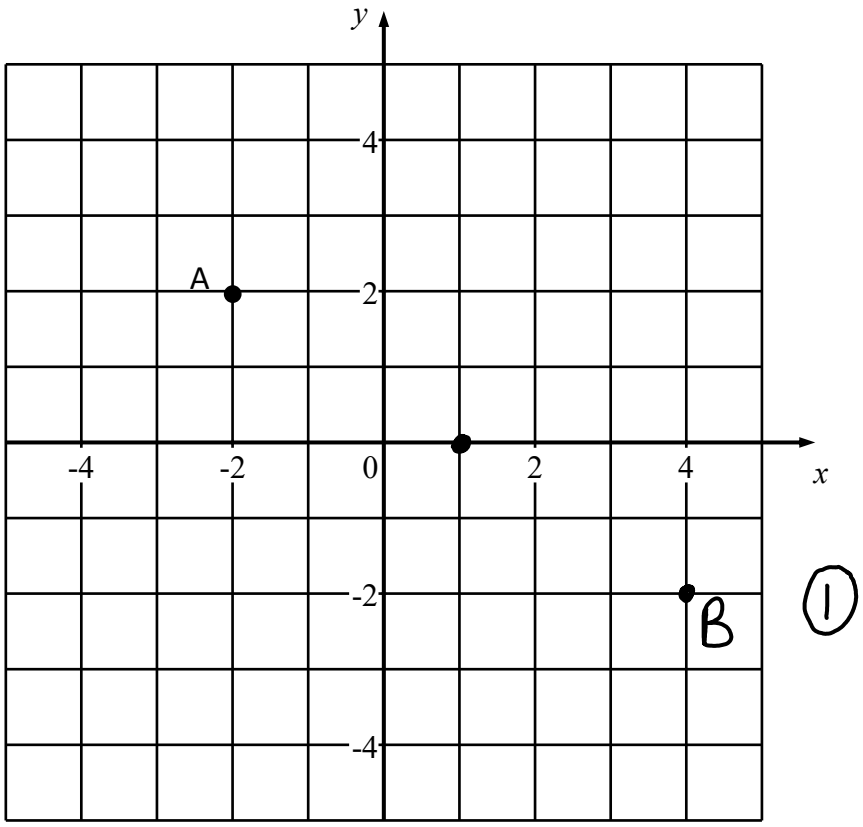
Answer: 36 [2]

12. Draw the reflection of each shape in the mirror line as shown.



[1]

13.



(1)

a) Plot the point (4, -2) and label it B.

[1]

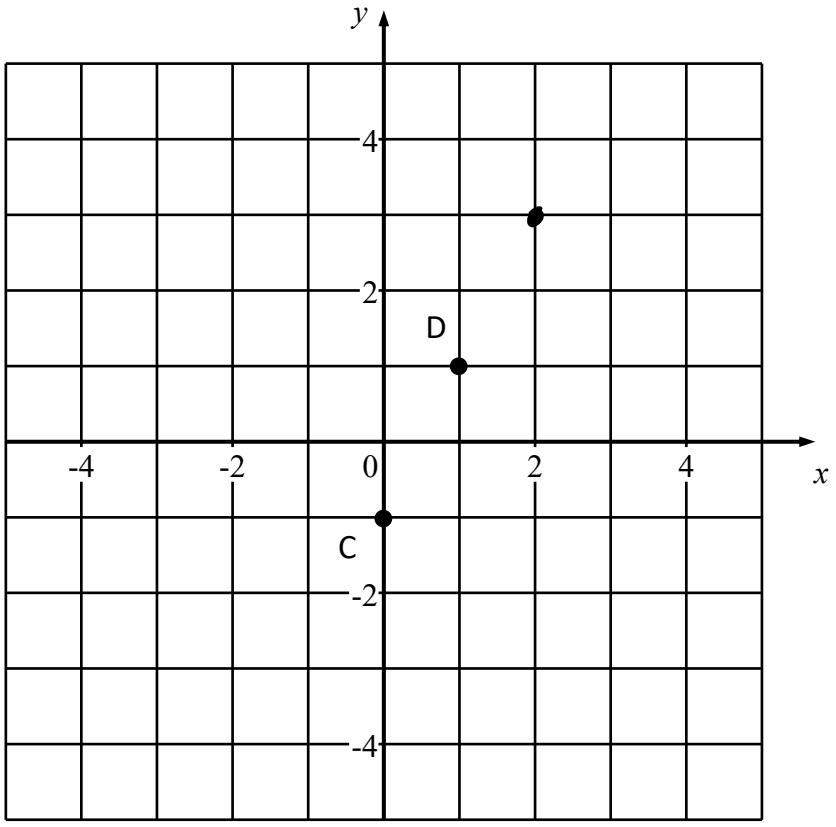
b) Plot the point that is midway between A and B and write down its coordinates below.

Answer: (____1____, ____0____) [2]

(1) for plotting the coordinate correctly

(1) for (1, 0) c.a.o.

Page total: 3



c) Point D is the point midway between the points C and E. Find the coordinates of the point E.

Answer: (____2____, ____3____) [2]

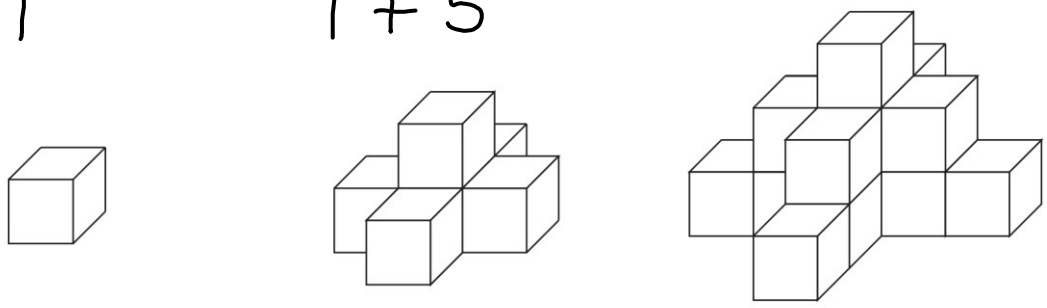
(1) (1)

14. A set of solid towers are made by adding layers as shown below. The shape is solid inside with no missing blocks.

1 + 5 + 9

1 + 5

1



1 2 3

a) How many cubes are needed to build tower number 2?

Answer: 6 [1]

b) How many cubes are needed to build tower number 3?

Answer: 15 [1]

c) Without drawing it, how many cubes would be needed to build tower number 5?

1 + 5 + 9 + 13 + 17 (m1) for sum

(or 15 + 13 + 17)

Answer: 45 [2]

d) Which tower number would contain 120 cubes?

+21 66

+25 91

+29 120

Answer: 8 [2]

Page total: 6

(m1) for +21 +25 + 29

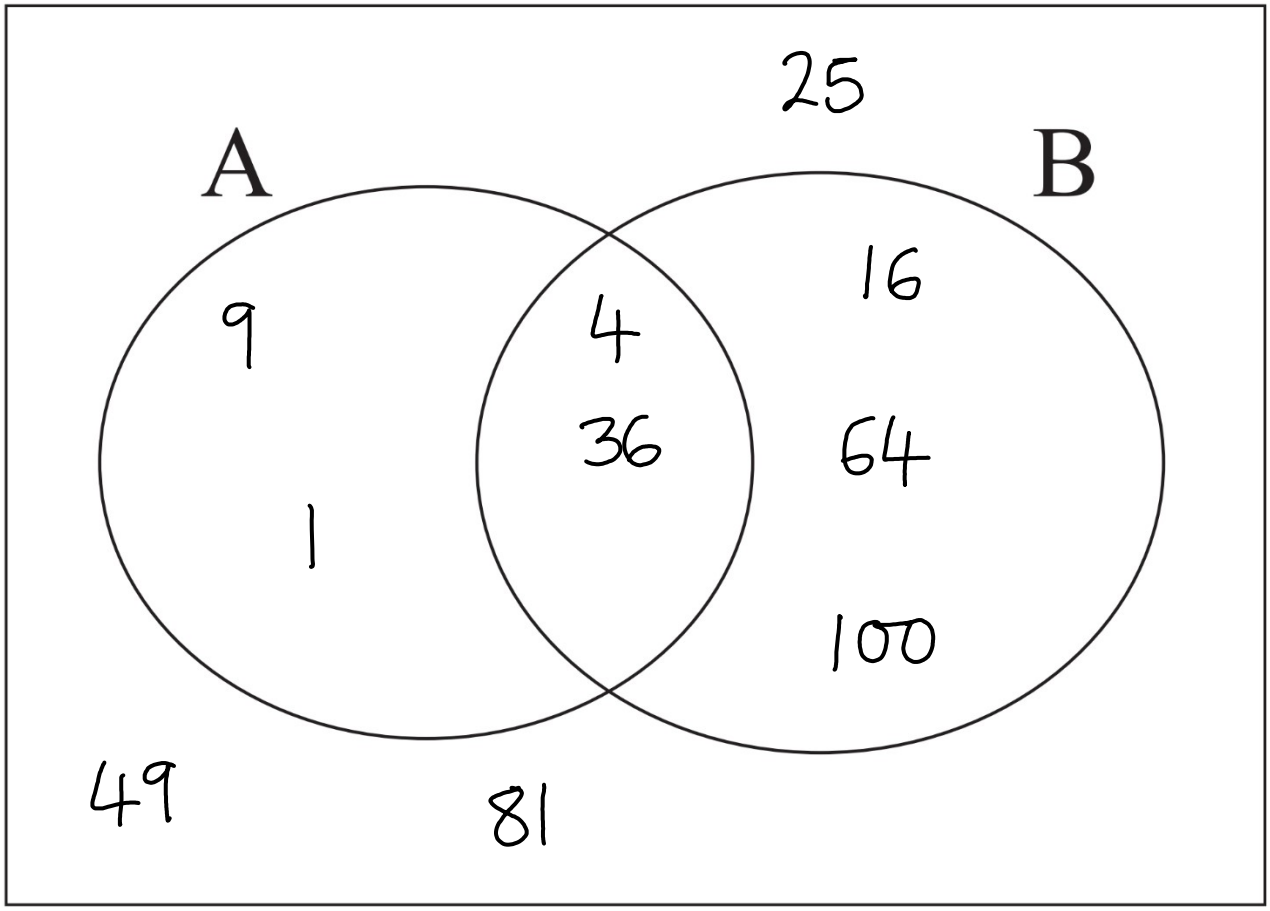
15. Write all the square numbers between 1 and 100, inclusive, in the correct region in the diagram below.

Circle A needs to contain factors of 360.

Circle B needs to contain multiples 4.

You will need to put some numbers outside of the two circles.

(Advice : tick correctly placed numbers)



Full marks for perfectly correct

Ignore any numbers missing / incorrect [4]

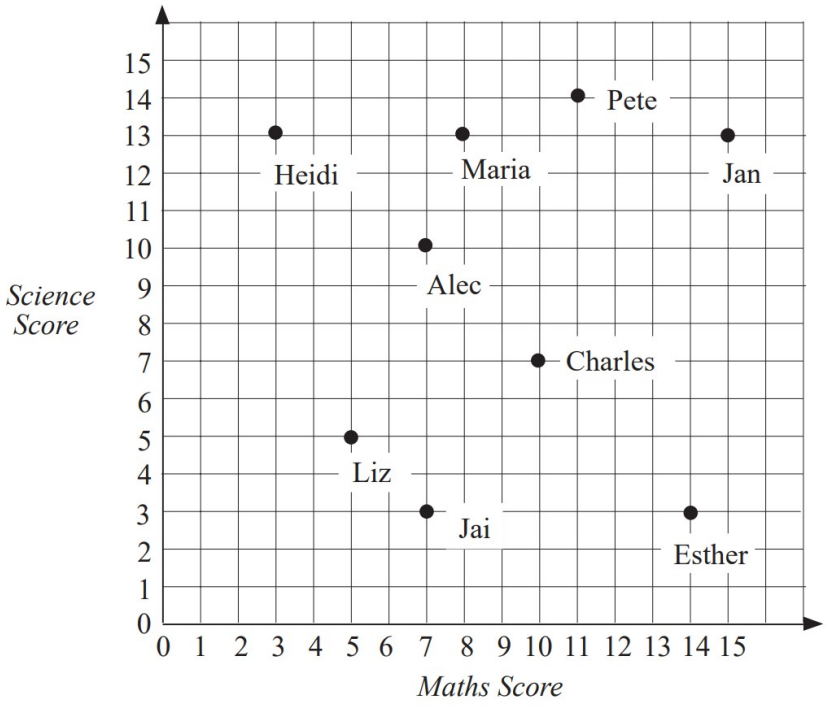
(m1) 3 numbers correctly placed

(m2) 4, 5, 6 numbers correctly placed

(m3) 7, 8, 9 numbers correctly placed

Page total: 4

16. The scatter plot shows the maths and science scores for 9 pupils.



a) Who had the highest score in maths?

Answer: Jan [1]

b) Who is good at science and poor at maths?

(Accept misspellings)

Answer: Heidi [1]

c) The total of the two scores are added together. Who has the highest total?

Jan : 15 + 13 = 28 (M1) for 15 + 13

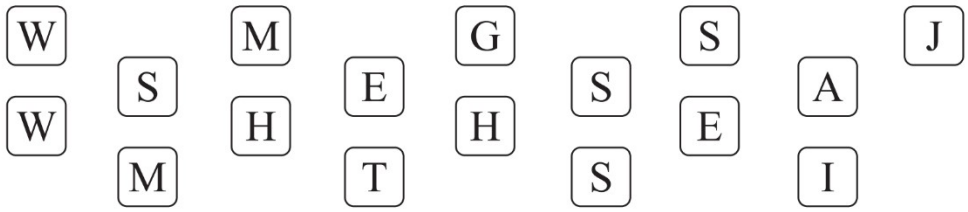
Pete : 11 + 14 = 25

Answer: Jan [2]

(special case : (1) for 28 without name given)

Page total: 4

17. Some children in a class write down the first letter of their surname on a card; these cards are shown below:



A card is chosen at random.

a) Which letter is most likely to be taken?

Answer: S [1]

b) Which (two) letters have the same probability of being chosen as an E?

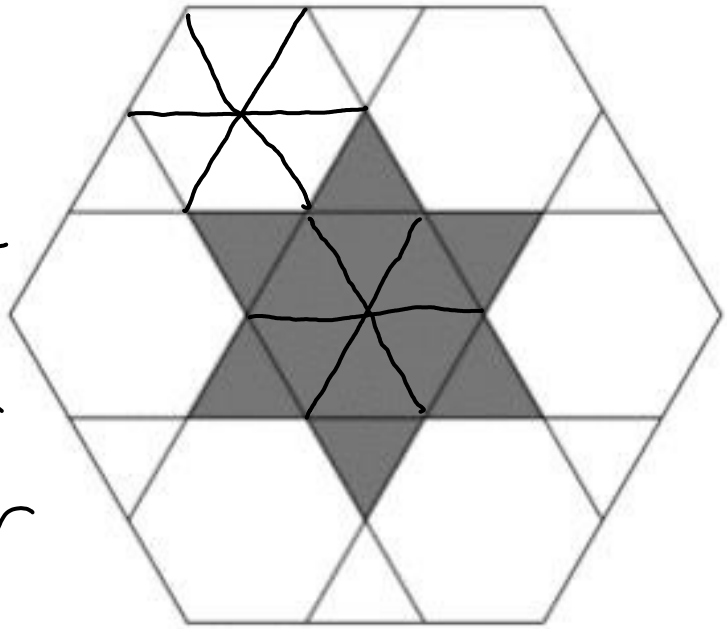
Two of H or M or W

Answer: _____ [2]

18. The diagram shows a design formed by drawing six lines in a regular hexagon. The lines divide each edge of the hexagon into three equal parts. What fraction of the hexagon is shaded?

$7 \times 6 = 42$

$+12$



$\frac{12}{54} = \frac{2}{9}$

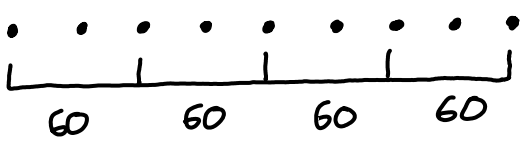
M1 For 12

M2 For 54

Full marks for $\frac{12}{54}$ or any equivalent fraction.

Answer: $\frac{12}{54}$ or $\frac{2}{9}$ [3]

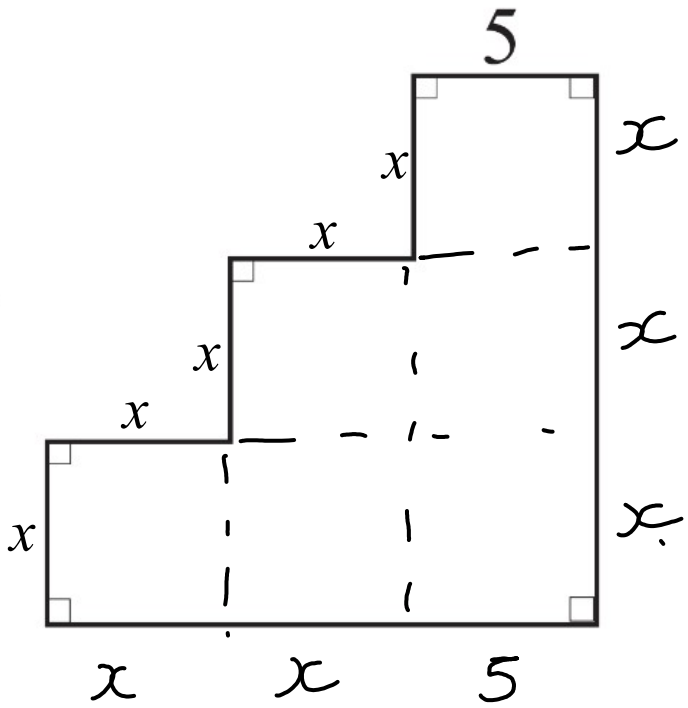
19. Whilst driving to work Alison noticed that there were nine lamp posts equally spaced along a road. The distance from the first to the third is 60m. How far is it from the first to the last?



M1 for 60×4 or 30×8

Answer: 240 [2]

20. The perimeter of this shape is 40 units. The sides labelled x are all the same length. Find the length of one of these sides.



$(2 \times 5) + (10 \times x) = 40$ (1)

$10 \times x = 30$ (1)

$x = 3$

Answer: 3 [3]

21. The instruction $x * y$ means subtract x from y and then multiply by 3.

For example $2 * 6 = (6 - 2) \times 3 = 12$

a) Work out the value of $20 * 27$

Answer: 21 [1]

b) Work out the value of $10 * 6$

Answer: -12 [1]

c) Work out the value of a if $3 * a = 6$

$(a-3) \times 3 = 6$

$a - 3 = 2$

Answer: 5 [1]

d) Work out the value of b if $b * 5 = 9$

$(5-b) \times 3 = 9$

$5 - b = 3$

Answer: 2 [1]

e) Work out the value of c if $c * 5 = 4 * c$

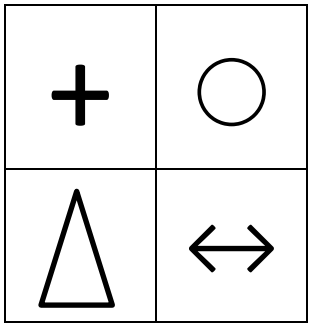
$(5-c) \times 3 = (c-4) \times 3$

$5 - c = c - 4$

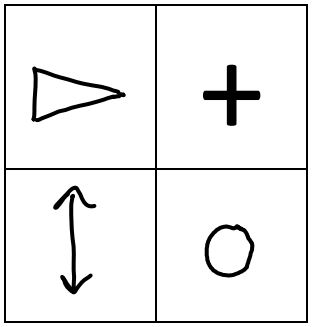
$9 = 2c$

Answer: 4.5 [1]

22. Sarah has designed a tile for her new kitchen as shown below.

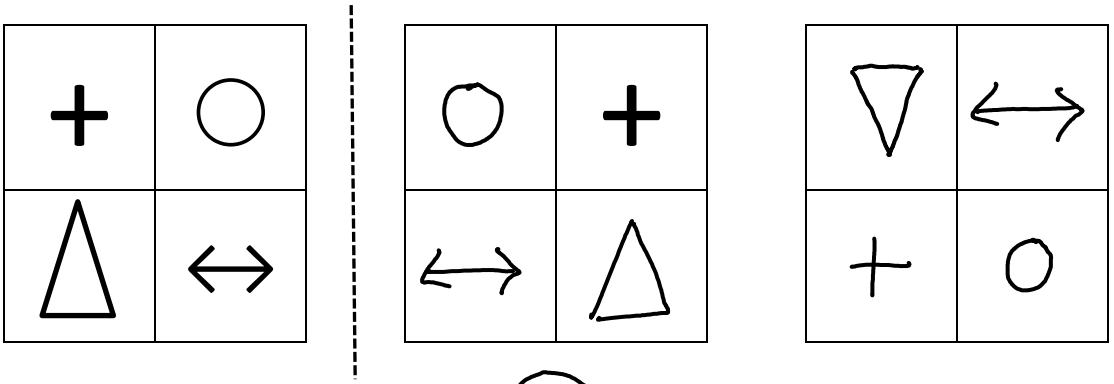


a) Complete the grid below to show the tile if it is **rotated** through a quarter turn clockwise.



[1]

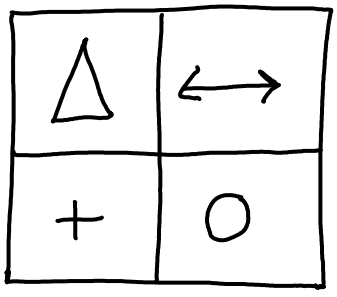
b) Sarah decides to **reflect** the tile in the dashed line shown below and **then rotate** it through half a turn.
Draw the resulting tile on the grid below. You may complete the middle tile if you wish.



M1

[2]

or M1



(for final answer)

23. For each of the following questions you need to find a whole number between 0 and 100 that has all of the following properties.

a) When the number is divided by 5 the remainder is 4.
When the number is divided by 6 the remainder is 0.
When the number is divided by 7 the remainder is 0.
What is the number?

must be divisible by 42 (M1)

42, 84, ..

Answer: 84 [2]

b) When the number is divided by 2 the remainder is 1. (a)
When the number is divided by 3 the remainder is 1. (b)
When the number is divided by 5 the remainder is 0. (c)
When the number is divided by 7 the remainder is 1. (d)
What is the number?

must end in a 5 (M1)

because of (a) and (c)

~~5~~ ~~15~~ ~~25~~ ~~35~~ ~~45~~ ~~55~~ ~~65~~ ~~75~~

Answer: 85 [2]

24. In this subtraction, P, Q, R, S and T represent single digits.

$$\begin{array}{rrrrr} 7 & Q & 2 & S & T \\ -P & 3 & R & 9 & 6 \\ \hline 2 & 2 & 2 & 2 & 2 \\ \hline \end{array}$$

Find the values of P, Q, R, S and T.

$$\begin{array}{rrrrr} 7 & \cancel{6}^{5} & \cancel{2}^{11} & 1 & 8 \\ 5 & 3 & 9 & 9 & 6 \\ \hline 2 & 2 & 2 & 2 & 2 \end{array}$$

P: 5 [1]

Q: 6 [1]

R: 9 [1]

S: 1 [1]

T: 8 [1]

Page total: 5

25. Anastasia thinks of a positive integer, which Barry then doubles. Next, Charlie trebles Barry's number. Finally, Damien multiplies Charlie's number by six. Eve notices that the sum of these four numbers is a perfect square. What is the smallest number that Anastasia could have thought of?

$a + 2a + 6a + 36a$ (m1)

$= 45a$ (m1)

$= 9 \times 5a$

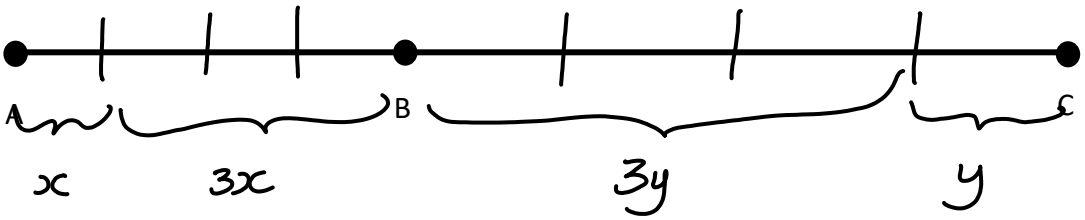
$\Rightarrow \quad a = 5$

Answer: 5 [3]

[(m1) for sight of 2, 6, 36

(m1) for 45 x any number]

26.



M1

Calum and his friend cycle from A to C, passing through B.

During the trip he asks his friend how far they have cycled.

His friend replies “one third as far as it is from here to B”.

Ten miles later Calum asks him how far they still have to cycle to reach C.

His friend replies again “one third as far as it is from here to B”.

How far from A will Calum have cycled when he reaches C?

$3x + 3y = 10$

$3(x + y) = 10$

Total $= 4x + 4y = 4(x+y)$ M1

$= \frac{4}{3} \times 10$

$= \frac{40}{3} = 13\frac{1}{3}$

Answer: $13\frac{1}{3}$ [3]

End of the Examination

If you have time, go back and check your answers and make sure that you have shown all of your working.