1. Work out:

a) $4126 - 2381$

$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{1}\,{}^{10}\not{2}\,6 \\ -\;2\;3\;8\;1 \\ \hline 1\;7\;4\;5 \end{array}$$

M1 for correct method with arithmetic mistake

Answer: 1745 A1 [2]

b) 29×351

$$\begin{array}{r} 3\;5\;1 \times \\ 2\;9 \\ \hline 3\;{}^{4}1\;5\;9 \\ 7\;{}^{1}0\;2\;0 \\ \hline 1\;0\;1\;7\;9 \end{array}$$

M1 for correct method with arithmetic mistake

Answer: 10179 A1 [2]

c) $330.4 \div 8$

$$8 \overline{)\,{}^{3}3\,{}^{1}3\,{}^{2}0.{}^{4}4} \quad 41.3$$

M1 for correct method with arithmetic mistake

Answer: 41.3 A1 [2]

d) $12.861 + \frac{3}{4}$

$$\begin{array}{r} 12.861 + \\ \text{A1} \rightarrow\; 0.750 \\ \hline 13.611 \\ {\scriptstyle 1\quad\;\;1} \end{array}$$

M1 for correct method with arithmetic mistake

Answer: 13.611 A1 [3]

Page total:

2. Fill in the missing numbers in these sequences:

a) 19 , 23.5 , 28 , 32.5 (A1) , 37 , 41.5 (A1) [2]

b) 9 , 2 , −5 , −12 (A1) , −19 (A1) [2]

c) 136 , 68 , 34 , 17 , 8.5 (A1) , 4.25 (A1) [2]

3. A farmer has 240 animals. $\frac{5}{12}$ of them are sheep. 40% of them are cows.

a) How many sheep does the farmer have?

$\frac{5}{12} \times 240$ (M1) $(240 \div 12) \times 5 = 20 \times 5$

(A1)

Answer: 100 [2]

b) How many cows does the farmer have?

full marks for just answer

10% of 240 = 24 (M1)

$24 \times 4 = 96$

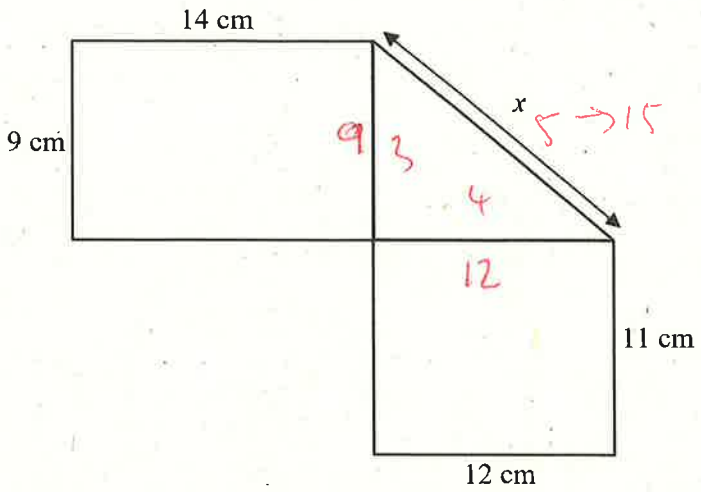
(A1)

Answer: 96 [2]

Page total:

/10

4. The compound shape below is made up of two rectangles and a right-angled triangle.



a) The outside perimeter of the compound shape is 86 cm. What is value of x?

$14 + 9 + 14 + 11 + 12 + 11 = 71$ (M1)

$86 - 71 = 15$

$x =$ 15 cm [2]

b) What fraction of the compound shape's total area is the triangle? Give your answer in its simplest form.

Rectangles $= 14 \times 9 + 12 \times 11 = 126 + 132 = 258$ (M1)

Triangle $= \frac{9 \times 12}{2} = 54$ (M1)

Fraction $= \frac{"54"}{"54" + "258"}$ (M1)

312

$= \frac{\text{triangle}}{\text{sum of both}}$

$\frac{54}{312} = \frac{27}{156} = \frac{9}{52}$

Answer: $\frac{9}{52}$ (A1) Must be simplified [4]

Page total:

KEY

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

a) $50 - (10 \div 2) =$ 45 (A1) ✓ [1]

b) $(30 -$ 16 $) \times 2 = 28$ (A1) ✓ Correct answers only [1]

c) $8 + (2 \times$ 6 $) = 3^2 +$ 11 $= 20$ (A1) (A1) ✓ [2]

+4

6. Below is the train timetable for the service from Poole to Southampton.

Poole	10:51	11:14	11:52	12:16
Parkstone	11:01	11:24	12:03	12:26
Bournemouth	11:09	11:36	-	12:38
Brockenhurst	11:21	11:49	-	12:51
Southampton	11:40	12:18	12:46	13:20

To get to work John has to walk 12 minutes to Parkstone Station, get the train to Southampton, and then walk 16 minutes to his office. If John has to get to work before 12:30 today, what is the latest time he can leave the house?

Correct method, but wrong final answer 2/3

12:30 − 0:16 = 12:14 (M1)

Needs first train

↳ 11:01 − 0:12 = 10:49 (M1) ✓ +3

~~To work~~

Correct answer, no workings 3/3

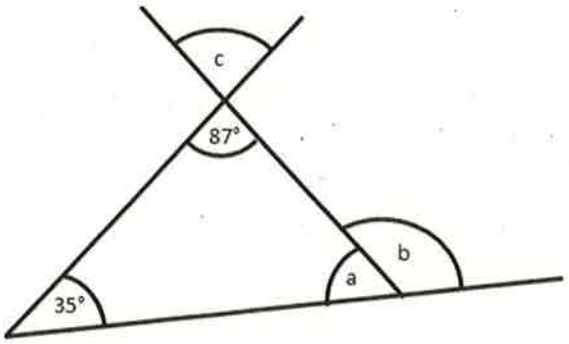
Wrong train station 1/3

(A1) ✓

Answer: 10:49 [3]

Page total: 7

7. Find the missing angles (diagrams not to scale):



M1

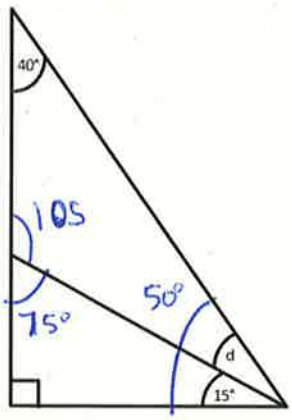
$180 - 87 - 35 = 58$

A1

Answer: a = 58 °[2]

Answer: b = 122 °[1] A1

Answer: c = 87 °[1] A1



$180 - 90 - 40 = 50$ M1 or labelled as bottom right total

"50" $- 15 = 35$ M1

OR

$180 - 90 - 15 = 75°$ M1 or labelled

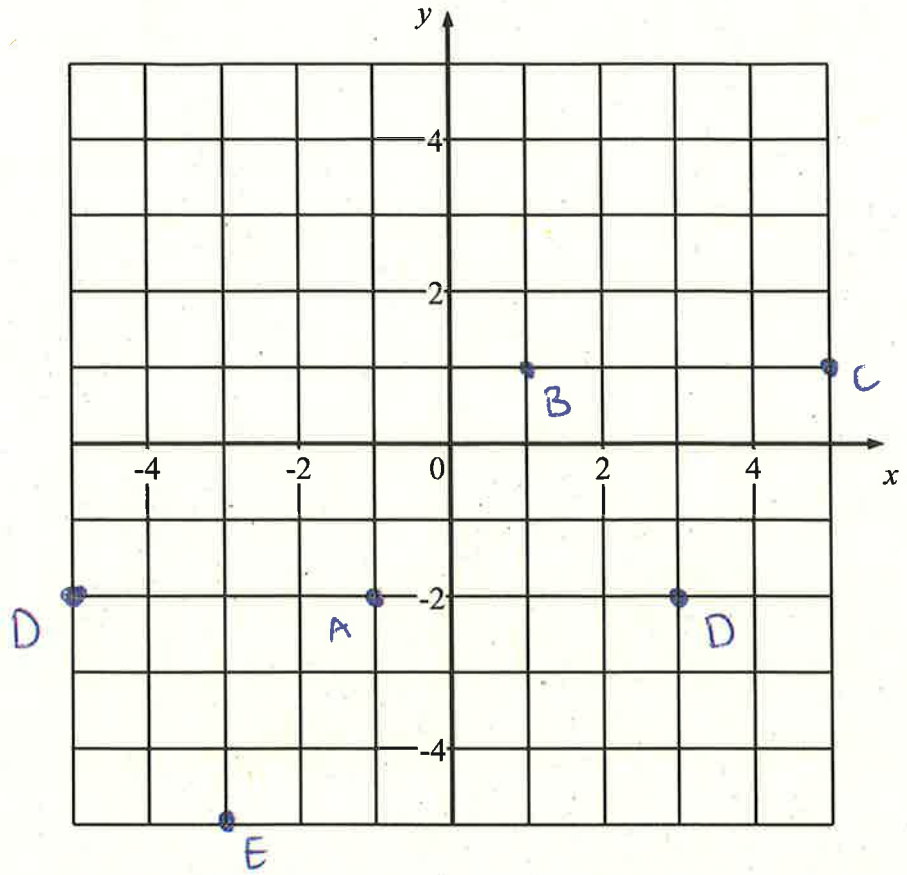
$180 - 40 - (180 - "75") = 35$ M1

A1

Answer: d = 35 °[3]

Page total:

8.



a) Plot and label the following points: *A* (-1, -2), *B* (1, 1) and *C* (5, 1). [2]

A1 for two correct
A2 for all three

b) Plot a fourth point and label it *D* such that *ABCD* is a parallelogram. [1]

A1
Allow either

c) *A* is midway between *B* and another point *E*.

What are the co-ordinates of the point *E*?

M1 for drawn on axes

A1

Answer : (-3 , -5) [2]

Page total:

9. There are 5 boys playing patball. Abdul is 5 years old, Bill is 7 years old, Calvin is 8 years old, Dmitri is 9 years old and Ethan is 11 years old.

a) What is the mean age of the group of boys?

$\frac{5+7+8+9+11}{5} = \frac{40}{5}$

M1

A1

Answer: 8 [2]

b) If one of the 5 boys leaves the game and the mean age of the remaining boys doesn't change, who would have left the game?

A1

Answer : Calvin [1]

c) If two of the 5 boys leave the game and the mean age of the remaining boys becomes 7 years old, who would have left the game?

New total = $3 \times 7 = 21$ M1

$40 - 21 = 19$ A1 OR $5+7+9=21$

Answer : Calvin and Ethan [3]

A1 for both correct

Page total:

2.5 hrs.
150 mins

10. Mark drives a 100 mile journey in 2 and a half hours.
How much faster would he have to drive if he wanted to complete the journey in 2 hours?

$100 \div 2.5 = 40$ mph (M1)

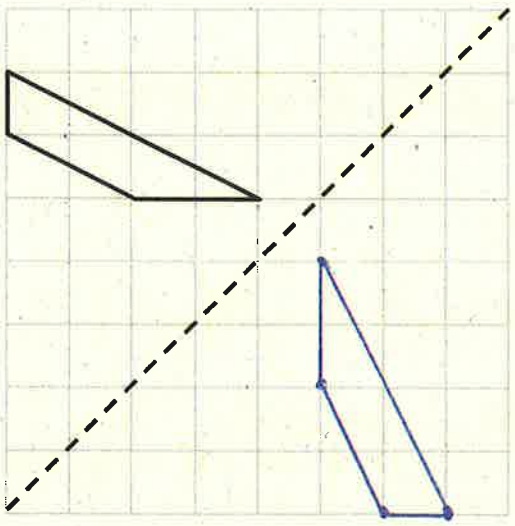
$100 \div 2 = 50$ mph (M1)

$50 - 40$

(A1)

Answer : 10 miles per hour [3]

11. a) Reflect the shape in the dotted line.



(A1) for at least two correct points

(A2) for perfect

[2]

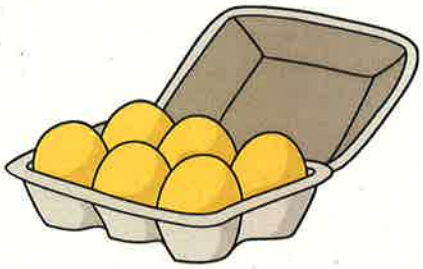
b) What type of quadrilateral is the original shape?

(A1)

Answer : Trapezium [1]

Page total:

12. Benny is making pancakes for a pancake party and needs to buy flour and eggs.



A bag of flour costs £1.15

A box of 6 eggs costs 95p

a) If Benny has £10 and buys 3 bags of flour, what is the maximum number of boxes of eggs he can buy?

$3 \times 1.15 = 3.45$

$10 - "3.45" = 6.55$ M1

$0.95 \times 6 = 5.70$

$0.95 \times 7 = 6.65$

A1

Answer 6 [2]

b) If Benny has £10 and buys only flour and eggs and this leaves him with £1.40 change, how much of each must he have bought?

$10 - 1.40 = 8.60$ A1

x 1.15	0.95
x 2.30	1.9
x 3.45	2.85
x 4.60	3.8
5.75	4.75
x 6.90	5.7
x 8.05	6.65
	7.6
	8.55

M1 M1 for lists or

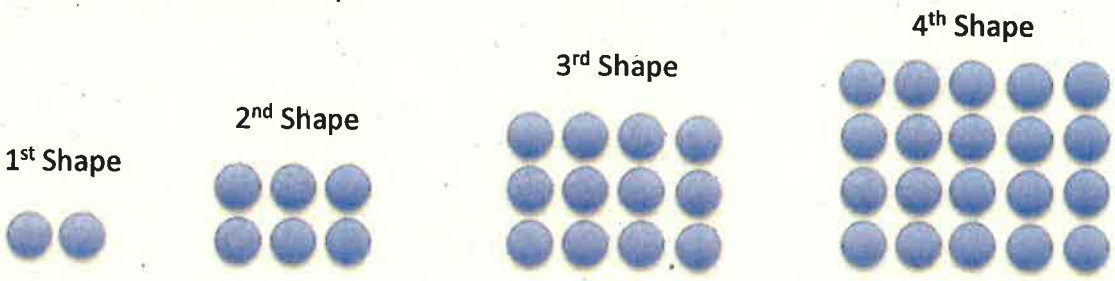
M1 for at least two trial & errors with numbers seen in lists (one from each list paired)

Page total:

Answer : 5 bags of flour, 3 boxes of eggs [4]

A1 for both correct

13. The below sequence of shapes is formed by adding a new row and column of dots onto the previous shape.



What is the first shape to be made up of more than 400 dots, and how many dots does it have?

$1^{st} = 1 \times 2$

$2^{nd} = 2 \times 3$

$3^{rd} = 3 \times 4$

$19^{th} = 19 \times 20 = 380$

$20^{th} = 20 \times 21 = 420$ (M1)

OR

+4 +6 +8

2, 6, 12, 20, 30, 42, 56

(M1) For continuing sequence for at least 3 more terms

$n(n+1) > 400$

$n^2 + n - 400 > 0$

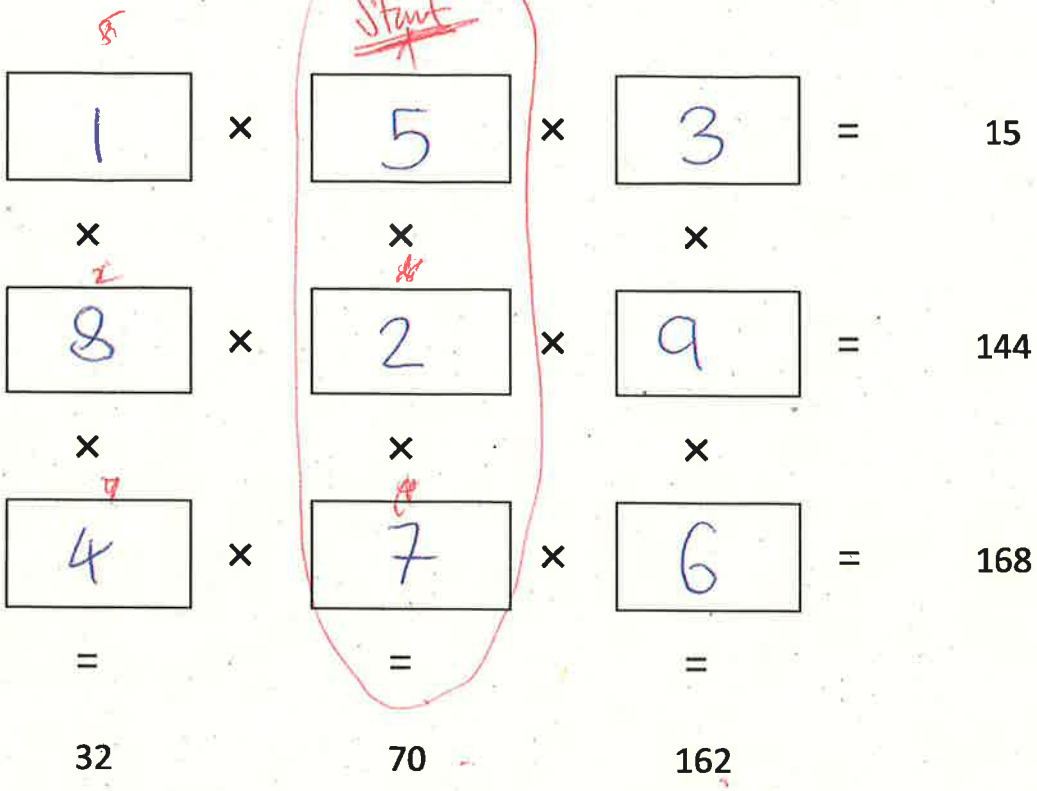
(M1A2)

Answer : 20^{th} Shape (A1)

420 Dots [3] (A1)

Page total:

14. Put the numbers 1 to 9 in the boxes below, using each number only once, to make the horizontal and vertical multiplications correct.



[5]

Marking

1 mark for each row or column with correct numbers in any order.

Up to 5 marks → If they get 5 they will definitely get the 6th right as well.

Page total:

15. The instruction $x \oplus y$ means subtract x from y and then divide 360 by the result.

For example: $2 \oplus 6 = 360 \div (6 - 2) = 90$

a) Work out the value of $5 \oplus 65$

$360 \div (60) = 6$

6 (A1)

Answer: _____ [1]

b) Work out the value of $\frac{1}{2} \oplus 1$

(M1)

$360 \div (\frac{1}{2})$

(A1)

720

Answer: _____ [2]

c) Work out the value of a if $a \oplus 5 = 180$

$5 - a = 2$ (M1)

(A1)

3

Answer: $a =$ _____ [2]

d) Work out the value of b, if c is 4 times bigger than b and $b \oplus c = 12$.

$c - b = 30$ (M1)

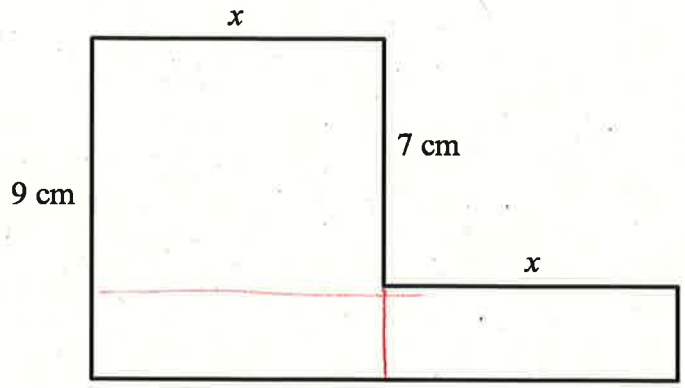
(A1)

10

Answer: $b =$ _____ [2]

Page total

16. Every x labelled on the shape below has the same value.



2cm ← A1

If the area of the shape is 88 cm^2, what is the perimeter of the shape?

$9x + 2x = 11x = 88$ M1

doesn't need to be algebraic

$7x + 4x = 11x = 88$

$x = 8$ A1

88/11 give mark

or

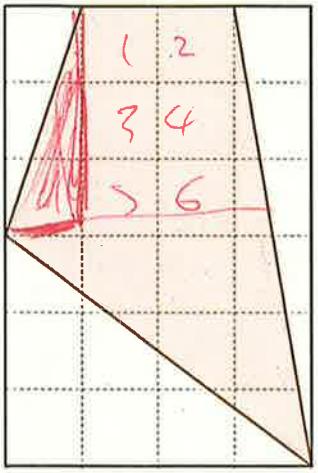
$8 + 8 + 9 + 7 + 2 + 16$

A1

Answer : 50 cm [4]

Page total:

17. Work out the area of the shaded quadrilateral below which is drawn on the grid that is made up of centimetre squares.



Counting squares

Rectangle $= 4 \times 6 = 24$ (M1)

Triangles missing $\Rightarrow \frac{3 \times 1}{2} = 1.5$

$\frac{3 \times 4}{2} = 6$ (M1 for at least two correct)

$\frac{6 \times 1}{2} = 3$

$24 - 6 - 3 - 1.5 =$

(A1)

Answer : 13.5 cm^2 [3]

18. Wilfred lists all the factors of an even number.
He finds that the second largest factor of the number is 54 bigger than the second smallest factor of the number.
What was the even number?

1 2 . . . .

Second smallest $= 2$ (A1)

Second largest $= \frac{n}{2}$ or "Half the number" (A1)

$\frac{n}{2} = 2 + 54 = 56$ (M1)

(A1)

Answer : 112 [4]

Page total:

19. It takes 2 bricklayers 4 and a half hours to build 3 walls.
Assuming the bricklayers work at the same pace and the walls are the same size,

a) How long would it take 2 bricklayers to build 1 wall?

4.5 ÷ 3 (M1)

Answer : 1 hours 30 minutes [2]

b) How long would it take 1 bricklayer to build 5 walls?

1 bricklayer 1 wall = "1 hr 30" (their (a)) × 2 (M1)
= 3 hrs.

3 × 5 = 15

Answer : 3 15 hours 0 minutes [2]

c) How long would it take 5 bricklayers to build 4 walls?

1 bricklayer 4 walls = 12 hours work (A1)

"12" ÷ 5 = 2.4 (M1)

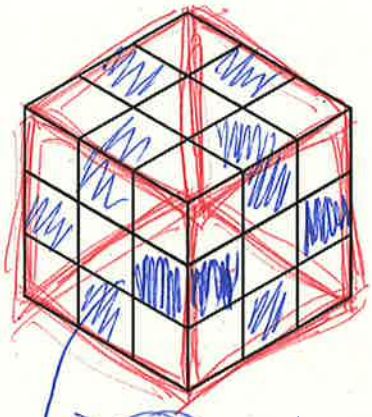
(A1)

Answer : 2 hours 24 minutes [3]

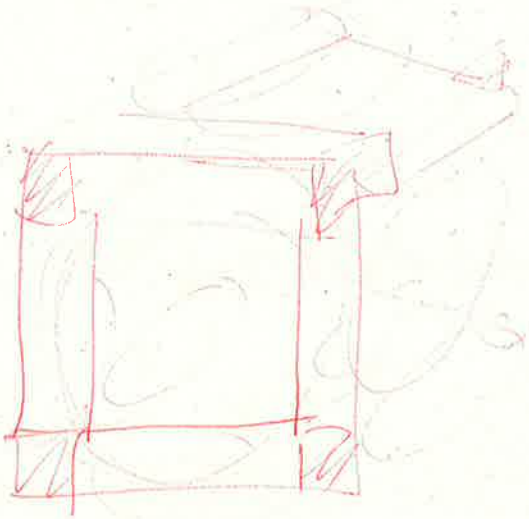
Page total:

20. A large cube is made up of a number of smaller cubes.
The number of small cubes that touch exactly four other small cubes face-to-face is 84.
How many small cubes make up the large cube?

(A 3 by 3 by 3 cube is shown purely to help you think about the problem, it is <u>not</u> the solution to the problem)



M1 Identifying its non-corner edges that are touching 4 others



Hollow

$9^3 - 7^3$

84 ÷ 12 = 7 (# of edges.) A1

7 + 2 = 9 (add in corners.) M1

9 × 9 × 9 M1

A1

Answer : 729 small cubes [5]

Page total: