DULWICH COLLEGE
FOUNDED 1619

Mathematics
Specimen Paper B Mark Scheme

Time allowed for this paper 60 minutes

Instructions

- Attempt all the questions.
- Do all your written work on this paper, **showing all your working**.
- Calculators must not be used.
- The numbers in square brackets are the marks available for each part of a question.
- You must not write in the squares at the bottom right of each page.
- There are 100 marks in total.

1. 543 + 284

$$\begin{array}{r} 543 \\ +\,284 \\ \hline 827 \end{array}$$

M1

A1

Answer: 827 [2]

---

2. 543 − 284

$$\begin{array}{r} {}^{4}\cancel{5}{}^{13}\cancel{4}3 \\ -\,284 \\ \hline 259 \end{array}$$

M1

A1

Answer: 259 [2]

---

3. 543 × 6

$$\begin{array}{r} 3000 \\ 240 \\ +\quad 18 \\ \hline 3258 \end{array}$$

M1

A1

Answer: 3258 [2]

---

4. 3258 ÷ 9

$$\begin{array}{r} 362 \\ 9\overline{)3^{3}2^{5}5^{1}8} \end{array}$$

M1

A1

Answer: 362 [2]

Page total: 8

5. Arrange the following numbers from smallest to largest:

$\frac{1}{3}$, 0.305 , 35% , $\frac{3}{10}$

M1 FOR SOME CONVERSION TO DECIMALS OR PERCENTAGES

A1 FOR ONE TWO IN CORRECT POSITIONS

A1 CONFIRM TWO IN CORRECT POSITIONS

$0.\dot{3}$, 0.305, 0.35, 0.3

• ALLOW ALTERNATIVE FORMS OF NUMBERS IN ANSWER

Answer: $\frac{3}{10}$, 0.305 , $\frac{1}{3}$, 35% [3]

---

6. Fill in the missing numbers of these sequences:

(a) 22 , 29 , 36 , 43 , 50 , 57

(b) 3 , 6 , 12 , 24 , 48 , 96

• ALLOW 1 MARK FOR EACH OF (a) AND (b) IF BOTH ANSWERS ARE WRONG BUT THE CORRECT COMMON DIFFERENCES / COMMON FACTORS ARE CLEARLY SHOWN

[4]

---

7. A multipack of 15 packets of crisps costs £3.90.

A packet of crisps costs 35 pence if they are bought individually.

Calculate how much cheaper it is to buy a multipack of 15 packets of crisps than to buy 15 packets individually.

35×15: $450 + 75 = 525$

M1 MULTIPLICATION

$5.25 - 3.90 = 1.35$

M1 SUBTRACTION

A1

Answer: £ 1.35 [3]

Page total: 10

8. The length of one statute mile is given as 1609.344 metres.

(a) Circle which of the following describes the position of the **6** in the number above.

Units | Tenths | Hundredths

Hundreds | Thousands | Tens

A1

[1]

(b) Round the number 1609.344 to the nearest ten.

Answer: 1610 A1 CSO [1]

---

9. (a) Circle which of the four options below shows a correct **rotation** of the word:

QUESTION

NOITSEUQ | QUESTION

ONESTION | NOITSEUQ

A1

[1]

(b) Circle which of the four options below show a correct **reflection** of the word:

EXAMINATION

• DEDUCT 1 MARK FOR EACH ERROR OR OMISSION

NOITANIMAXE | EXAMINATION

A1

EXAMINATION | ƎXAMINATION

A1

[2]

---

10. The pie chart below represents data collected in a survey of the summer holiday destinations of a sample of school children.

Half of the children went to Europe or the USA.

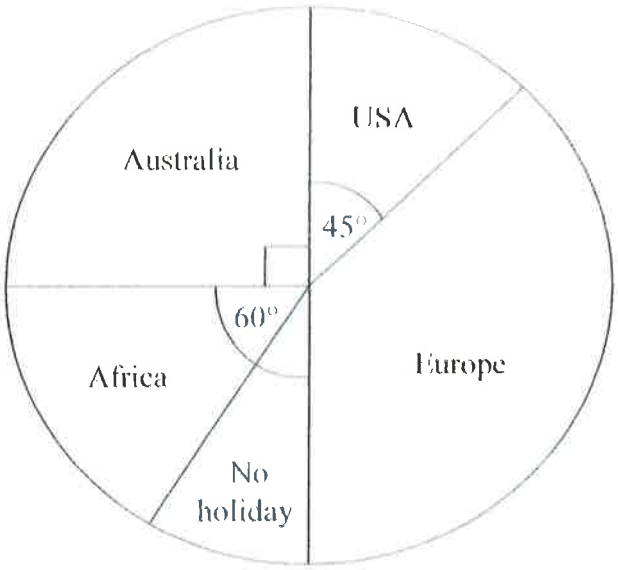


Diagram not drawn to scale

(a) Write down the angle of the wedge representing the number of school children who did not go on holiday.

A1

Answer: 30 [1]

(b) Write down the fraction of the children who travelled to the USA, giving your answer in its simplest form.

$\frac{45}{360}$ M1

A1

Answer: $\frac{1}{8}$ [2]

(c) A total of 180 children were asked to complete the survey. Calculate how many of the children went on holiday to Africa.

$\frac{60}{360} \times \frac{180}{1}$ M1 OR $\frac{1}{6}$ SEEN

A1

Answer: 30 [2]

(d) Estimate how many children would have visited Europe out of the whole school of 1600 pupils.

$\frac{135}{360} = \frac{3}{8}$ M1 FRACTION

M1 MULTIPLICATION (eg. 3×200)

$\frac{3}{8} \times \frac{1600}{1}$

A1

Answer: 600 [3]

Page total: 8

11. On a long straight country road, there are four villages: Josham, Keston, Langham and Moreton, which are shown in the diagram below.

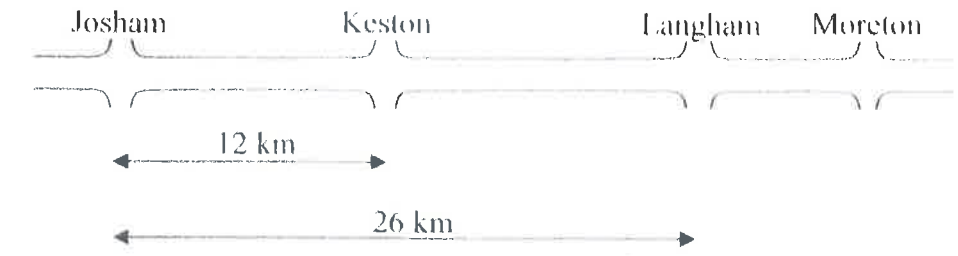


Diagram not drawn to scale

Distances between the villages are shown by the arrows.

(a) Work out the distances from:

(i) Keston to Langham;

26 − 12 M1 SUBTRACTION

Answer: 14 A1 km [2]

(ii) Langham to Moreton, giving your answer **in metres**.

23 − 14 = 9 A1

M1 ALLOW FOLLOW-THROUGH OF THEIR (a)

A1 CSO

Answer: 9000 m [3]

(b) If a tourist cycles at 14 km per hour, work out how long her journey would take from Josham to Moreton in hours and minutes.

12 + 23 = 35 M1

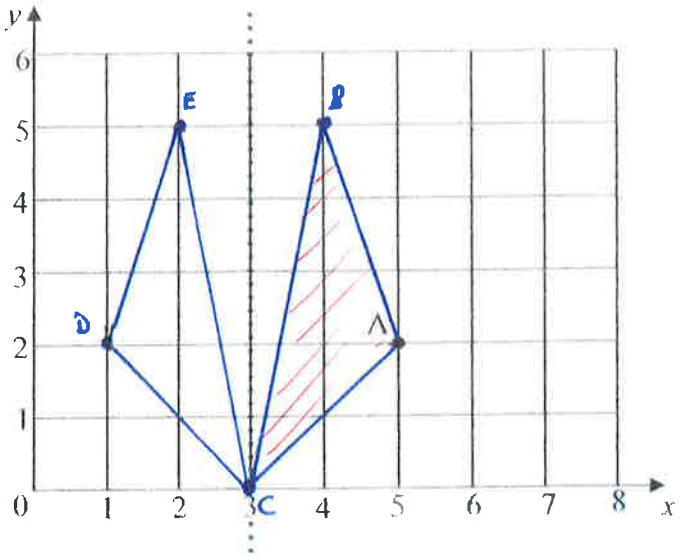
$\frac{35}{14} = 2 \cdot 5$ M1 DIVISION OR $2\frac{1}{2}$ SEEN

A1

Answer: 2 hours, 30 minutes [3]

Page total: 8

12. A, B and C are three points on a grid. A is at (5, 2), B is at (4, 5) and C is at (3, 0).



(a) Plot and label the other two points, B and C, and then join the three points and lightly shade the triangle you have formed. [2]

(A1) BOTH POINTS (A1) TRIANGLE EDGES (WITH OR WITHOUT SHADING)

(b) State the name of the type of triangle that has been formed.

Answer: SCALENE [1]

(A1) ALLOW "OBTUSE"

A mirror line is marked as the dotted line at $x = 3$. The triangle can be reflected in this mirror line so that point A ends up at a new point D and point B ends up at a new point E.

(c) Draw the reflected image of the triangle across this mirror line and label the two new points D and E. [2]

(A1) TRIANGLE CORRECT. (A1) LABELLED POINTS

(d) Write down the co-ordinates of these new points D and E:

Answer: D is at (1 , 2) and E is at (2 , 5) [3]

(A1) (A1) (A1)

One of these new points, D or E, can be joined up to point A and to the origin to create an isosceles triangle.

(e) Write down which new point completes this triangle in the diagram and explain briefly what it means for a triangle to be isosceles.

Point E (A1) will form an isosceles because an isosceles triangle HAS 2 SIDES OF EQUAL LENGTH (A1) [2]

Page total: 10

13. A prime number has exactly 2 factors: itself and 1.

The numbers from 1 to 20 inclusive are written on 20 cards. Write down the **proportion** of all the cards that have a prime number written on them, giving your answer as a decimal.

2, 3, 5, 7, 11, 13, 17, 19 (M1) LISTING

$\frac{8}{20} = \frac{4}{10}$ (M1) FRACTION

• ALLOW 2 MARKS IF USED 1 IN A PRIME BUT AN ELSE CORRECT: "9 PRIMES"

(A1) CSO ⇒ $\frac{9}{20} = 0.45$"

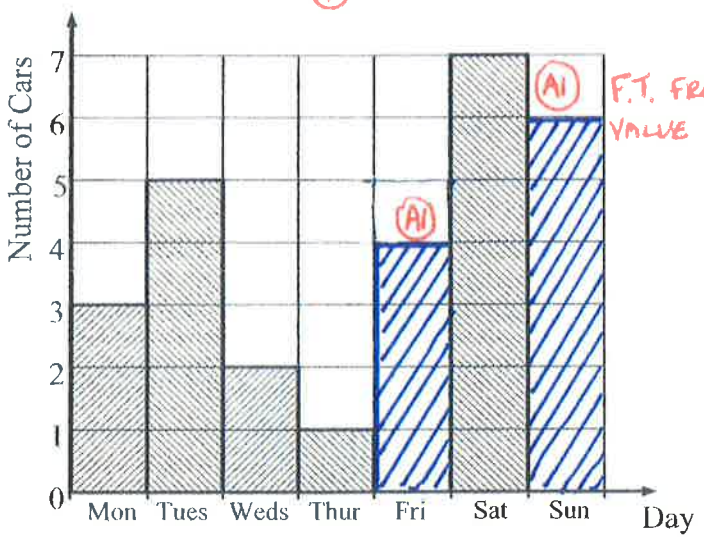
Answer: 0.4 [3]

---

14. The table and bar chart below shows the number of cars sold by a car showroom each day for a week.

Day	Mon	Tues	Weds	Thur	Fri	Sat	Sun
Number of cars sold	3	5	2	1	4	7	6

(A1) (A1)



F.T. FROM INCORRECT VALUE IN TABLE

(a) Use the information in the table and the bar chart to complete the entry for **Wednesday** in the table and the bar for **Friday** on the chart.

[2]

(b) The total number of cars sold in the week was 28. Use this information to help complete both the table and the bar chart with **Sunday**'s entry.

3+5+2+1+4+7 = 22 (M1)

28 − 22 = 6

[3]

Page total: 8

15. The diagram shows a plan of the rectangular garden of local celebrity Louis Cowell-Cole, with an L-shaped fish pond in the middle. The dimensions of the garden and the pond are shown below.

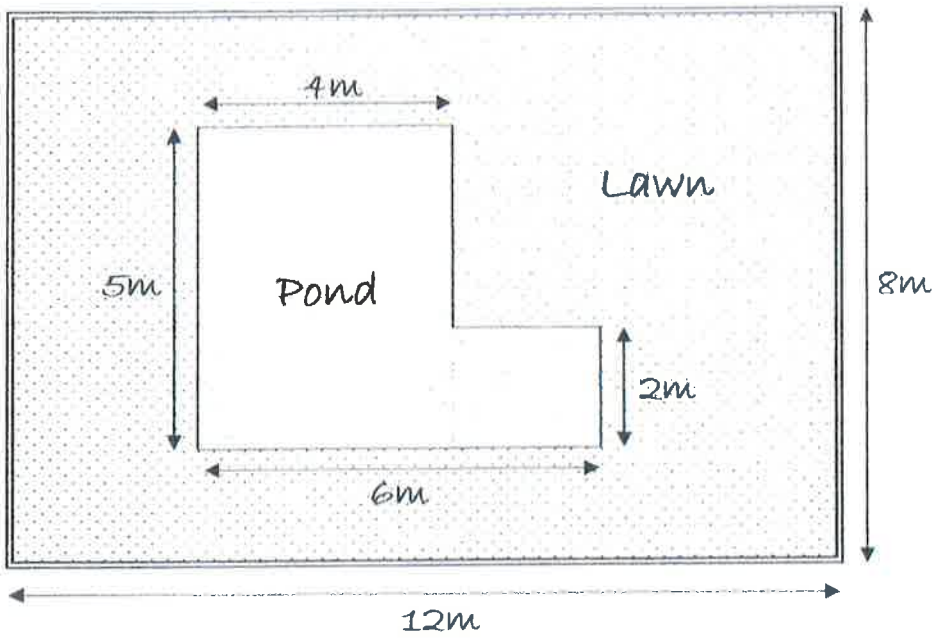


Diagram not drawn to scale

(a) Work out the area of the fish pond.

$5 \times 4 = 20$
$2 \times 2 = 4$

(M1) FOR AREA CALCULATION SHOWN (L×W)
(M1) FOR EVIDENCE OF SPLITTING UP SHAPE

Answer: 24 m^2 [3]

(b) Work out the area of the lawn.

$8 \times 12 = 96$
$96 - 24 = 72$

(M1) MULTIPLICATION
(M1) SUBTRACTION (F.T THEIR ANSWER TO (a))
(A1) 72

Answer: 72 m^2 [3]

Louis wants to put a stone path around the edge of the garden, just **inside** the existing perimeter fence. Each paving slab is a square with sides 1 metre.

(c) Work out how many paving slabs are needed to complete this path.

$12 + 8 + 12 + 8 = 40$
$40 - 4 = 36$

(M1) CALCULATING PERIMETER
(A1) ALLOW FOLLOW THROUGH OF PERIMETER AS LONG AS SUBTRACTION OF DUPLICATED CORNER SQUARES SHOWN

Answer: 36 [2]

Page total: 8

15. continued:

Louis hires a builder to lay the path. The builder charges £8 per hour basic labour for the job, and then £1.50 per slab he lays.

(d) If he takes 3½ hours to finish the job, work out his overall fee.

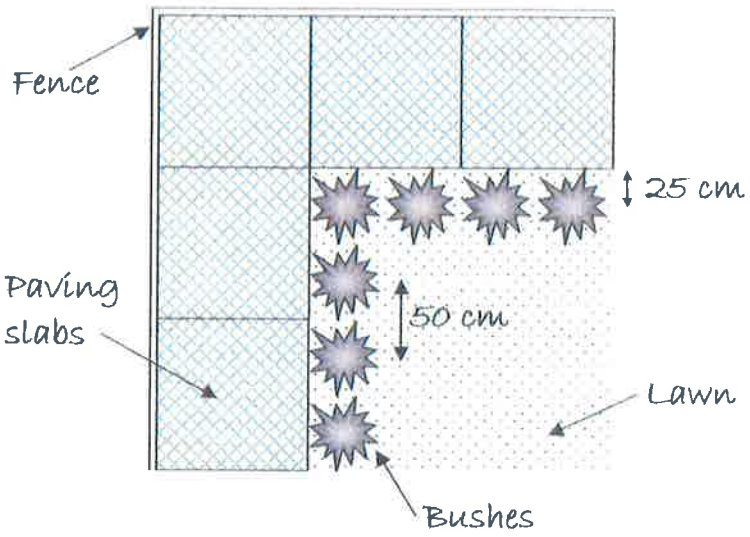
$8 \times 3\frac{1}{2} = 28$ (M1) HOURS WORKED

$1.5 \times 36 = 54$ (M1) SLABS LAID (F.T. THEIR (c))

(A1) CSO.

Answer: £ 82 [3]

Louis then decides to plant a row of bushes around the inside of the stone path. Each bush is to be planted 25 cm from the edge of the path, and 50 cm from its neighbouring bushes. The diagram below displays how this might look near a corner of the garden.



(e) Calculate how many bushes are required to complete this in total.



$10 \times 2 \times 2 = 40$

$6 \times 2 \times 2 = 24$ (M1) ADDING NEW DIMENSIONS: NB 2 BUSHES PER METRE

$24 + 40 = 64$

$64 - 4 = 60$ (M1) SUBTRACTING 4 DUPLICATED CORNERS

(A1) CSO.

Answer: 60 [3]

- ALLOW 2 MARKS FOR ANSWER OF "29" WITH SOME WORKING
- ALLOW 1 MARK FOR "64" OR "56"

Page total: 6

16. In five of his mid-term tests, each out of 10 marks, Darshan scores 9 in Mathematics, 6 in English, 8 in Geography, 4 in History and 8 in Science.

(a) Write down the mode of Darshan's five scores.

9, 8, 8, 6, 4

Answer: 8 (A1) marks [1]

(b) Work out the range of marks that Darshan scores.

9 − 4 (M1) SUBTRACTION

• AWARD 1 MARK IF "4 → 9" WRITTEN

Answer: 5 (A1) marks [2]

(c) Calculate the mean average score that he achieved in these five tests.

9 + 6 + 8 + 4 + 8 = 35 (M1) ADDITION

$\frac{35}{5}$ (M1) DIVISION BY 5

Answer: 7 (A1) marks [3]

(d) After his French mark is announced, Darshan's average score from all six tests falls to 6.5 marks. Calculate the mark he scored in his French test.

6.5 × 6 = 39 (M1) FINDING TOTAL

39 − 35 = 4 (M1) SUBTRACTION (F.T. FROM TOTAL IN (c))

Answer: 4 (A1) marks [3]

(e) The pass mark for each test is 50%. Write down what fraction of Darshan's six tests (including his French) he managed to pass, leaving your answer in its simplest form.

9, 8, 8, 6, 4, 4

$\frac{4 \text{ PASSES}}{6 \text{ EXAMS}}$ (M1) NUMBER OF PASSES (F.T. FROM SOLUTION TO (d))

(A1) CSO.

Answer: $\frac{2}{3}$ marks [2]

Page total: 11

16. continued

In the end of term tests, Darshan scores 15 out of 20 in his History.

(f) Work out what his percentage improvement is in this subject

40% → 75% M1 BOTH PERCENTAGES SEEN OR IMPLIED

75 − 40 = 35 M1 SUBTRACTION

87½%

Answer: 35 A1 % [3]

---

17. Work out what time it is now if the time that has passed since nine o'clock this morning is five times as much as the time that is left before eleven o'clock this morning.

2 HOURS = 120 MINUTES M1 NUMBER OF MINUTES IN TOTAL OR 6 PARTS IN TOTAL

5t + t = 6t = 120

⇒ t = 20 mins BEFORE 11:00 M1 20 MINUTES AS A PART

A1

Answer: 10 : 40 [3]

---

18. In 1 tree, 2 chimps can eat 3 bananas in 4 minutes.

(a) Work out how long it would take 2 chimps to eat 6 bananas.

$\frac{6}{2} = 3$ $2 \times 4 = 8$

A1

Answer: 8 minutes [1]

(b) Work out how many chimps would be required to eat 21 bananas in 8 minutes. (You can assume that the tree has a large number of bananas available and that the chimps all have big appetites!)

21/6 = 3·5 M1 ANY SENSIBLE METHOD

3·5 × 2 = 7

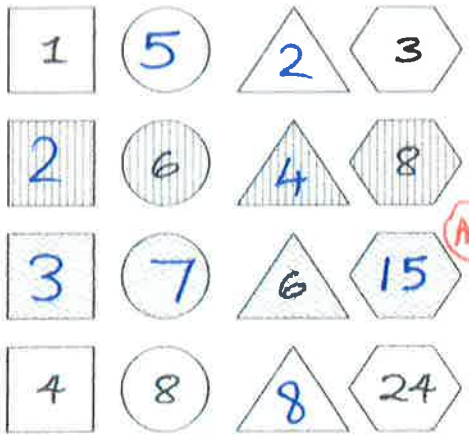
A1

Answer: 7 [2]

Page total: 9

19. The sixteen shapes in the grid each contain a number with the following rules:

- The numbers in the circles are four more than the numbers in the squares on the same row.
- The numbers in the triangles are double those of the numbers in the squares on the same row.



A1 C.S.O.

(a) Complete the missing numbers in the squares. [2]

A1 EACH SQUARE

(b) Complete the missing numbers in the circles and triangles. [2]

A1 BOTH CIRCLES
A1 ALL 3 TRIANG.

(c) Identify the pattern that links the other numbers to the hexagonal numbers in each row. Write one of the four arithmetic symbols (+ , − , × , ÷) in each of the two gaps either side of the circle, to complete the following formula linking all the numbers in any row of shapes.

• AWARD 1 MARK FOR THE SPECIAL CASE OF "+, ÷"

Answer: □ A1 × ○ A1 − △ = ⬡ [2]

(d) Complete the grid above by adding the appropriate number to the empty hexagon, using your formula.

[1] 15

(e) If a fifth row is added below the four displayed, write down what number would be in the fifth hexagon.

5 × 9 − 10 = 35

M1 FOR 5, 9, 10 EVEN WITH WRONG OPERATIONS

A1 C.S.O.

Answer: 35 [2]

Page total: 9