DULWICH COLLEGE
FOUNDED 1619

Mathematics
Specimen Paper C 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. $617 + 385$

$$\begin{array}{r} {}^{1}{}^{1}617 \\ +\ 385 \\ \hline 1002 \end{array}$$ M1

Answer: 1002 A1 [2]

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2. $617 - 385$

$$\begin{array}{r} {}^{5}{}^{1}\cancel{6}17 \\ -\ 385 \\ \hline 232 \end{array}$$ M1

Answer: 232 A1 [2]

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3. 617×6

$$\begin{array}{r} 3600 \\ 60 \\ +\ 42 \\ \hline 3702 \end{array}$$ M1

Answer: 3702 A1 [2]

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4. $385 \div 7$

$$7\overline{)385} = 055$$ M1

Answer: 55 A1 [2]

Page total: 8

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

5. Fill in the missing numbers from these sequences:

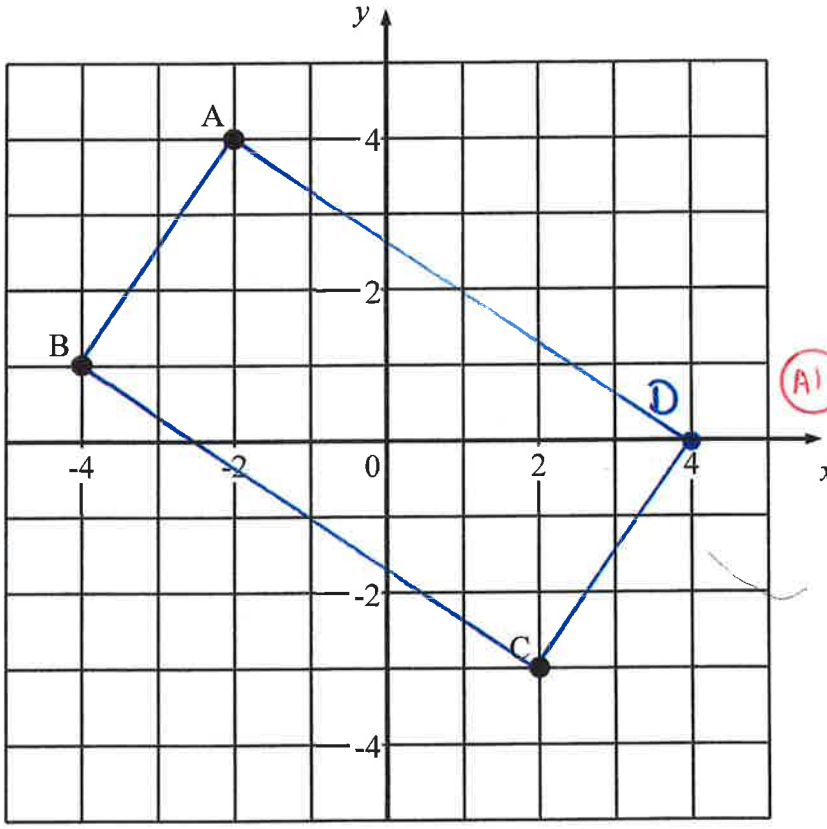
(a) 18 , 25 , 32 , 39 , 46 , 53 (A1) (A1)

(b) 5 , 9.5 , 14 , 18.5 , 23 , 27.5 (A1) (A1)

[4]

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6. The grid below contains three points, labelled A, B and C.
A has co-ordinates (–2, 4) and B has co-ordinates (–4, 1).



(A1) NEED BOTH POINT D AND THE OUTLINE OF THE RECTANGLE FOR THE MARK

(a) Write down the co-ordinates of the point C.

(A1) (A1)

Answer: C is at (2 , -3)

[2]

(b) Add a fourth point to the grid, labelling it D, so that when they are joined in the order ABCD the four points create a rectangle. Write the co-ordinates of point D below.

(A1) FOR THE WHOLE PAIR

Answer: D is at (4 , 0)

[2]

Page total: 8

7. By how much is four and a half greater than three and seven eighths?
Write your answer as a **fraction**.

$4\frac{1}{2} - 3\frac{7}{8}$ (M1) SUBTRACTION SHOWN

$= \frac{9}{2} - \frac{31}{8}$

$= \frac{36}{8} - \frac{31}{8}$ (M1) COMMON DENOMINATOR SHOWN

(A1)

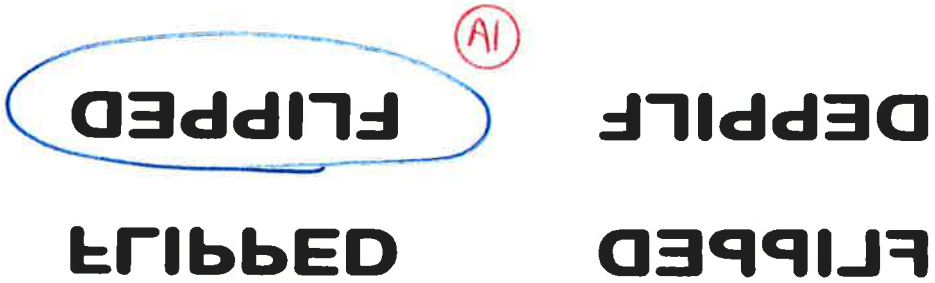
Answer: $\frac{5}{8}$ [3]

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

FLIPPED

(A1)

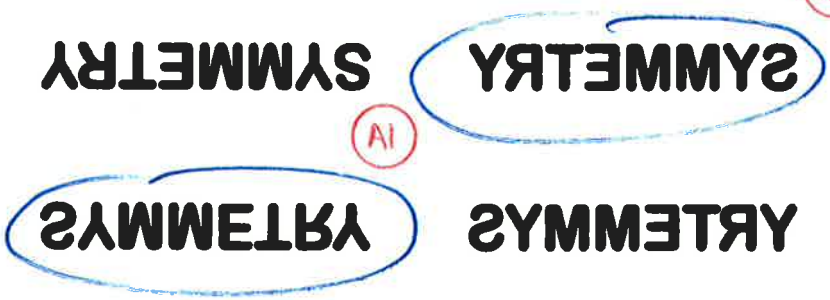


[1]

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

SYMMETRY

(A1) • DEDUCT 1 MARK FOR EACH ERROR OR OMISSION



[2]

Page total: 6

9. The pie chart below represents data collected in a survey of the favourite sports of a sample of school children. Note that, between them, Rugby and Football were the favourite of half of the children surveyed.

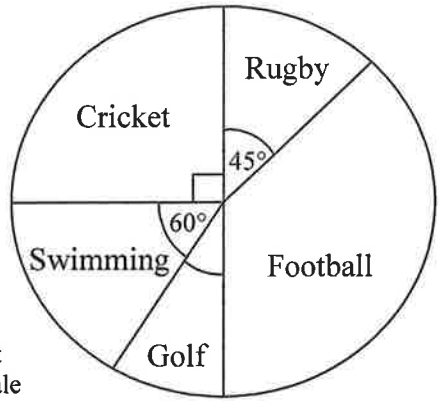


Diagram not drawn to scale

(a) Write down the angle of the wedge representing the number of school children who said Golf was their favourite sport.

Answer: 30° (A1) [1]

(b) Write down the fraction of the children who said that Rugby was their favourite, giving your answer in its simplest form.

$\frac{45}{360}$ (M1)

Answer: $\frac{1}{8}$ (A1) [2]

(c) A total of 240 children were asked to complete the survey. Calculate how many of the children listed Football as their favourite.

$\frac{3}{8} \times \frac{240}{1}$ (M1) OR 30° SEEN

Answer: 90 (A1) [2]

(d) The whole school has 1320 pupils. Estimate how many of them you would expect to describe Swimming as their favourite sport, judging by the information in the pie chart.

$\frac{1}{6} \times \frac{1320}{1}$ (M1)

Answer: 220 (A1) [2]

Page total: 7

10. (a) Write twelve fiftieths as a decimal.

$\frac{12}{50} = \frac{24}{100}$ M1

A1

Answer: 0.24 [2]

(b) Write one eighth as a percentage.

$\frac{2}{8} = \frac{1}{4} = 25\%$

$\frac{1}{8} = \frac{25\%}{2}$ M2 OR 0.125 SEEN

A1

Answer: 12.5 % [3]

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11. A sleeper train leaves London at 22:45 and reaches Aberdeen at 06:30 the next morning.

(a) Work out how long the journey takes in hours and minutes.

1:15
6:30 M1 BEFORE AND AFTER MIDNIGHT

A1

Answer: 7 hours 45 minutes [2]

A jumbo jet also leaves London at 22:45 and takes a total of 11 hours, 35 minutes to fly to Hong Kong. Hong Kong is 7 hours ahead of London (i.e. when the time is 13:00 in London, it is 20:00 in Hong Kong).

(b) Work out what the local time is in Hong Kong when the flight lands. Give your answer in 24 hour form.

22:45
+ 11:35 M1 ANY SENSIBLE METHOD
34:20

⇒ 10:20 the next day
A1 (London time)

A1

Answer: 17 : 20 [3]

Page total: 10

12. Clare went to the sweet shop with her weekly pocket money. She saw that lollipops cost 35p, and she worked out that if she bought 8 lollipops she would end up with 30p left from her pocket money.

(a) Work out how much money Clare had in total, giving your answer in pounds and pence.

8×35
$= 280p$ (M1)

$2{\cdot}80$
$0{\cdot}30$
$£3{\cdot}10$

(A1)

Answer: £3·10 [2]

She then worked out that if she bought only 5 lollipops, she would have exactly the right amount of money left over to buy 3 packets of jelly gums.

(b) Work out the price of one packet of jelly gums.

$5 \times 35 = 175$ (A1)

$310 - 175 = 135$ (M1) Allow from (a)

$\frac{135}{3} = 45$ THROUGH

Answer: £0·45 (A1) [3]

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13. At the school medical centre, there are enough plasters to patch up 12 cut knees per day for 30 days. Work out how long the plasters would last if the medical centre were having to treat 20 boys with cut knees a day.

$12 \times 30 = 360$

$\frac{360}{20} = 18$ (M2) OR ANY SENSIBLE METHOD

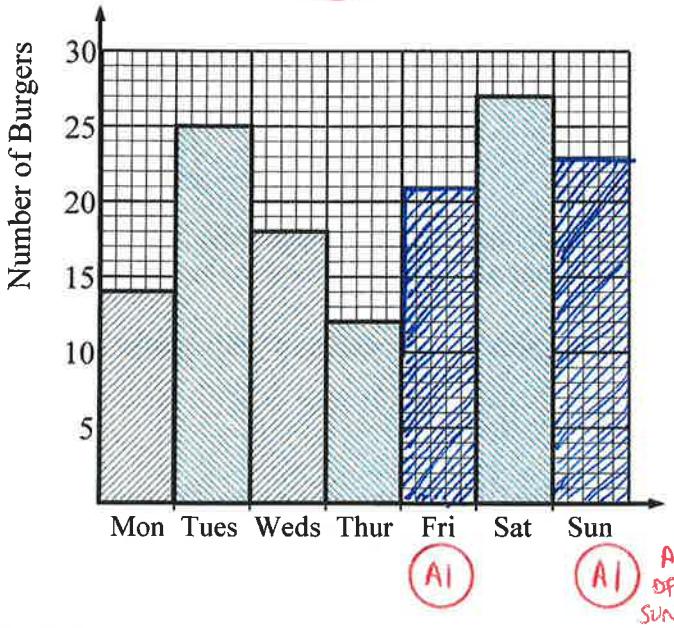
Answer: 18 (A1) days [3]

Page total: 8

14. The table and bar chart below shows the number of burgers sold by a cafe each day for a week.

Day	Mon	Tues	Weds	Thur	Fri	Sat	Sun
Number of burgers sold	14	25	18	12	21	27	23

A1 A1



A1 A1

ALLOW FOLLOW THROUGH OF INCORRECT VALUE FOR SUNDAY 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 burgers sold in the week was 140. Use this information to help complete both the table and the bar chart with **Sunday**'s entry.

14
25
18
12
21
+ 27
117

140
- 117 M1
23

[3]

15. Arafin has four rectangular tiles which he arranges as shown below, leaving a square hole in the middle of the tiles.

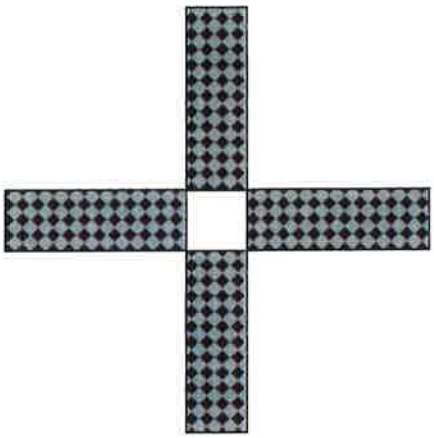


Diagram not drawn to scale

The hole in the middle has an area of 400 cm².

(a) Calculate the width of one of the tiles.

$400 = 20 \times 20$ M1

Answer: 20 A1 cm [2]

The area of the four tiles combined is 12 times as large as the area of the hole in the middle.

(b) Calculate the length of one of the tiles.

$\frac{12}{4} = 3$ M1 EACH TILE

3×20 M1 ALLOW FOLLOW THROUGH OF (a)

Answer: 60 A1 cm [3]

(c) Work out the perimeter of one of the tiles, giving your answer **in metres.**

$2(20+60) = 160$ cm

M1 ALLOW FOLLOW THROUGH OF (a) AND (b)

Answer: 1.6 A1 CSO m [2]

Page total: 7

16. Searching in the sock drawer of his wardrobe, Graham is able to find 30 loose socks of assorted colours. A third of them are white, and of the non-whites remaining, two fifths are blue. The rest are all red.

(a) Work out how many blue socks he finds.

10 WHITE M1

$\frac{2}{5} \times 20 = 8$ BLUE

Answer: 8 A1 [2]

(b) Write down how many pairs of red socks he could make.

∴ 12 RED M1

Answer: 6 A1 [2]

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17. On the five school days of a given week, Joshua recorded how many minutes late his school bus arrived each morning. Here is what he found:

Monday	–	5 minutes
Tuesday	–	8 minutes
Wednesday	–	4 minutes
Thursday	–	10 minutes
Friday	–	8 minutes

(a) Write down the mode of the amount of minutes the bus was late over the week.

Answer: 8 A1 minutes [1]

(b) Work out the range of the five times that Joshua recorded.

10 − 4 M1

Answer: 6 A1 minutes [2]

Page total: 7

(c) Calculate the mean average time that the bus was late over the course of the week.

$5+8+4+10+8 = 35$ (M1) ADDITION

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

Answer: 7 (A1) minutes [3]

The following Monday, Joshua again records how many minutes late the bus arrives, and combining this with his results from the previous week, the mean average late time is now at 6 minutes.

(d) How much was the bus late by on that second Monday?

$6 \times 6 = 36$ (M1) MULTIPLICATION

$36 - 35 = 1$ (M1) SUBTRACTION

Answer: 1 (A1) minutes [3]

Joshua keeps recording this information each morning. By the end of the Thursday of the second week, the mean average has now fallen to 4 minutes.

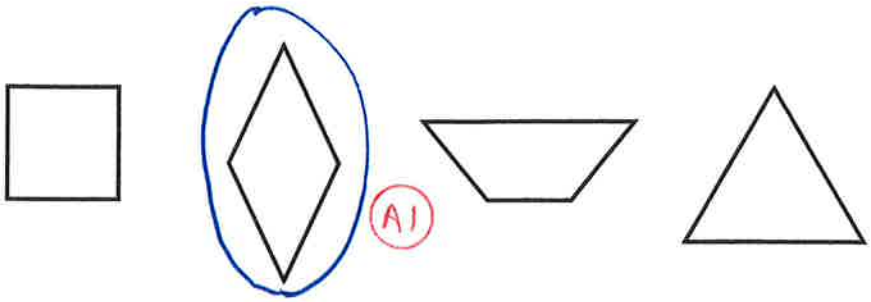
(e) Explain what this tells us about the number of minutes that the bus was late over the middle three days of the second week.

9 days : $9 \times 4 = 36$ ⇒ same as after the Monday (M1) MULTIPLICATION

BUS IS ON TIME OVER THE NEXT 3 DAYS: IT IS NOT LATE (A1) ANY SENSIBLE WORDING: ACCEPT EXPLANATION WITH EARLY ARRIVAL TO COMPENSATE LATENESS ETC. [2]

Page total: 9

18. (a) Circle which of the following shapes has two both lines of symmetry and rotational symmetry of order 2.



A1

[1]

(b) Give the **full name** of the shape above which has exactly three lines of symmetry.

A1 FULL NAME A1 SPELLING

Answer: EQUILATERAL TRIANGLE [2]

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19. The competitors in the Tour de France cycling race are all given race numbers to wear. Based on last year's results, the captain of the leading team has the honour of wearing number 1 and the other members of his team wear the numbers 2 to 9.







The captain of the next team in the rankings wears number 11 and his team-mates are given the race numbers from 12 to 19. The third team get allocated the race numbers from 21 to 29, and so on.

This process continues until all riders have been given a unique number that identifies them individually, but also identifies which team they are on.

(a) Write down how many riders there are in each team.

A1

Answer: 9 [1]

Page total: 4

(b) The last race number to be issued is number 209. Write down how many teams there are in the race.

Answer: 21 (A1) [1]

(c) Calculate how many riders there are in the race in total.

21 × 9 (M1) MULTIPLICATION: FOLLOW THROUGH THEIR (a) × (b)

(A1) CSO.

Answer: 189 [2]

(d) Calculate how many zeros occur in the list of all the race numbers from 1 to 209.

101 – 109
201 – 209 (M1) ANY SENSIBLE METHOD

(A1) CSO

Answer: 18 [2]

(e) If 42 riders failed to finish the 3-week-long race, either through crashing out or abandoning the race, work out what fraction of the number of riders who started the race actually **completed** the whole event. Leave your answer in its simplest form.

$\frac{42}{189} = \frac{2}{9}$ Crashed (M1) SIMPLIFY FRACTION: FOLLOW THROUGH THEIR (c)

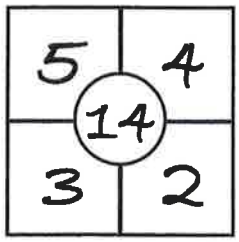
(M1) SUBTRACTION: $1 - \frac{2}{9}$ OR 189 – 42 RECOGNISING SOLUTION IS SUCCESSFUL RIDERS.

(A1)

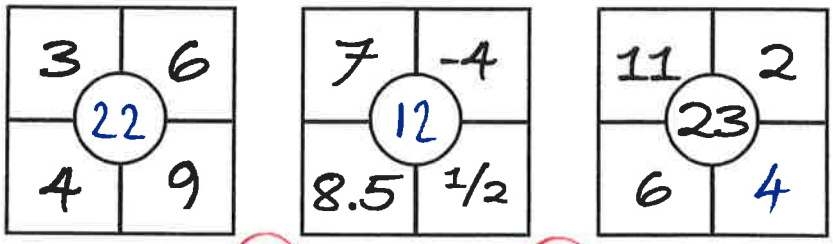
Answer: $\frac{7}{9}$ [3]

Page total: 8

20. In the each of the grids below, the numbers in the four square boxes around each circle must be added together to give the number in the circle. For example, 5 + 4 + 3 + 2 = 14, so:

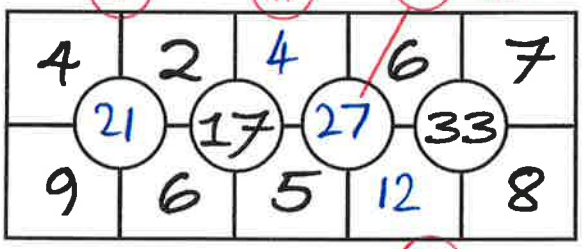


(a) Complete the three grids below with the correct number into each of the relevant squares or circles.



A1 A1 A1 [3]

(b) Complete the network of grids below with the correct number into each of the relevant squares or circles.



A1 A1 A1 FOLLOW THROUGH OTHER INCORRECT ANSWERS

A1 [4]

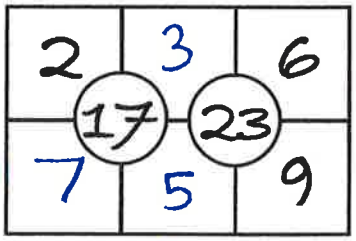
In the final network of grids below, the numbers must all be whole numbers greater than zero, and **the same number must not appear more than once**.

(c) Complete this final network below with the correct number into each of the relevant squares or circles.

23 - 9 - 6 = 8

M1 IDENTIFYING MIDDLE COLUMN SUMS TO 8

17 - 8 - 2 = 7



A1 CSO [3]

ADD UP TO 8:

A1 EITHER 3 5 OR 5 3

1+7 ✗
2+6 ✗
3+5 ✓
4+4 ✗

Page total: 10

21. The number 21 can be written as the sum of **three** different prime numbers:

$$21 = 3 + 5 + 13$$

Show which numbers between 9 and 19 inclusive can be written as the sum of 3 different prime numbers, writing your answers in the spaces at the bottom of the page and using the gap between for rough working as necessary. If it is not possible to make a particular number, tick the box on the right hand side.

PRIMES: 2, 3, 5, 7, 11, 13

4 MARKS AVAILABLE

(-1) FOR ONE OR MORE SUITABLE TICKS MISSING.

(-1) FOR EXTRA TICKS APPLIED INCORRECTLY.

(-1) FOR "2" NOT INCLUDED AS PRIME.

(-1) FOR 1, 9, 15 OR EVENS > 2 USED AS PRIME INAPPROPRIATELY.

9 = _____ or not possible: ☑

10 = 2+3+5 or not possible: ☐

11 = _____ or not possible: ☑

12 = 2+3+7 or not possible: ☐

13 = _____ or not possible: ☑

14 = 2+5+7 or not possible: ☐

15 = 3+5+7 or not possible: ☐

16 = 2+3+11 or not possible: ☐

17 = _____ or not possible: ☑

18 = 2+3+13 or 2+5+11 or not possible: ☐

19 = 3+5+11 or not possible: ☐

[4]

Page total: 4

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.