Haileybury

Mathematics
Entrance exam for: 14+
Time allowed: 45 minutes
Total marks: 50

Please read this information before the examination starts

- Answer **all** questions
- Please write your solutions in the answer book provided.
- You may **not** use a calculator.

This paper is split into 2 sections of generally increasing difficulty.

Section A (20 marks)
Section A is designed to test core skills and understanding. You should answer each question in the answer booklet provided.

Section B (30 marks)
Section B contains a greater element of problem solving. It contains a mixture of multiple choice and written answer questions. You should answer the questions in the space provided in the answer booklet and you will be marked on the presentation of your written work in addition to your final solution, answers without supporting work/calculations may not score full marks.

Section A

Each of the following questions are worth 1 mark

Write your answers in the answer booklet provided

1	Calculate $238 - 71$
2	Calculate 41×16
3	Calculate $\frac{3}{8} + \frac{5}{16}$
4	Calculate $\frac{3}{11} \div \frac{4}{7}$
5	Expand and simplify $(x + 5)(x - 1)$
6	Solve $x + 7 = 11$
7	Solve $5 + 3x = 8$
8	Solve $\frac{5}{x} = 3$
9	Fully simplify $\frac{x+4}{3x^2+12x}$
10	Solve $3x + 5 \leq 10$

Each of the following questions are worth 2 marks.

Write your answers in the answer booklet provided.

11	If $a = -5, b = 8$ and $c = 4$, find the value of $a^2 + \frac{2b}{c}$
12	Solve $3(x - 5) = x + 9$
13	Expand and simplify $4(3x - 2) - 2(2x + 5)$
14	Make x the subject of the equation $5x + b = ax$
15	Find the midpoint of the coordinates $(-2, 8)$ and $(4, 2)$.

Section B

Each of these multiple-choice questions is worth 2 marks.

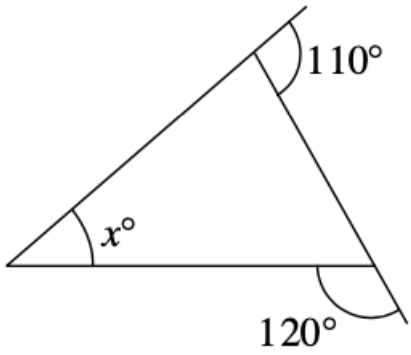
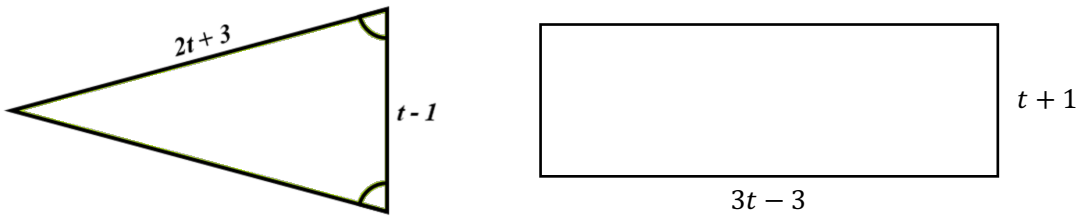
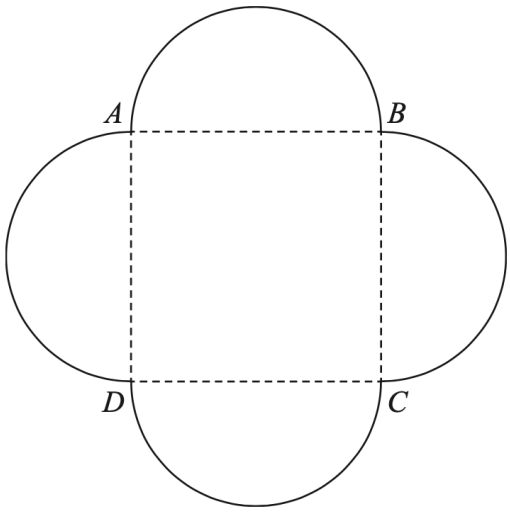
You must provide clear reasoning for your solution in order to gain both marks.

1	It has just turned 21:14. How many minutes are there until midnight? A: 46 B: 116 C: 146 D: 166
2	What is the smallest prime number that is the sum of three different prime numbers? A: 11 B: 15 C: 17 D: 19
3	Write $x^2 - 8x + 3$ In the form $(x + p)^2 + q$ A: $(x-4)^2 - 13$ B: $(x-4)^2 - 11$ C: $(x-4)^2 + 19$ D: $(x-4)^2 + 5$
4	Given that $516 \times 40 = 20640$, work out $10320 \div 516$ A: 20 B: 40 C: 80 D: 258
5	The mean of 3 numbers, x, y and z is $2x$. What is the mean of y and z? A: $\frac{3x}{2}$ B: $2x$ C: $\frac{5x}{2}$ D: $3x$

For the following questions you should show all of your working clearly.

Correct answers without working may not receive full marks.

Please write your answers in the answer booklet provided.

6	Solve the following simultaneous equations: $3x + 2y = 17$ $4x - y = 30$	**[4]**
7	What is the value of x in this triangle?  	**[3]**
8	Find the value of t if the perimeter of this isosceles triangle is equal to the perimeter of the rectangle.  	**[4]**
9	The diagram shows a shape made from a square $ABCD$ and 4 identical semicircles.  As shown in the diagram, the semicircles have AB, BC, CD and DA as diameters. The area of the square is $64\ cm^2$. Calculate the total area of the shape. Give your answer in terms of π.	**[4]**

10	The distance between Exeter and London is 132 miles. At 10:00 on Tuesday Sam left from Exeter for London and Morgan left from London for Exeter. They travelled on the same road. Up to the time when they met, Sam's average speed was 25 miles per hour, and Morgan's average speed was 35 miles an hour. How far away from Exeter were they when Sam and Morgan met?	**[5]**
END OF EXAM		