GCSE Mathematics

Practice Tests: Set 10

Paper 1H (Non-calculator)

Time: 1 hour 30 minutes

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators may be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question*.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (*a*) Write 5.7×10^6 as an ordinary number.

.....

(1)

(*b*) Write 0.004 in standard form.

.....

(1)

(Total for Question 1 is 2 marks)

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2 (*a*) Simplify $e^9 \div e^5$

.....

(1)

(*b*) Simplify $(y^2)^8$

.....

(1)

(*c*) Expand and simplify $(x + 9)(x - 2)$

.....

(2)

(*d*) Factorise fully $16c^4p^2 + 20cp^3$

.....

(2)

(Total for Question 2 is 6 marks)

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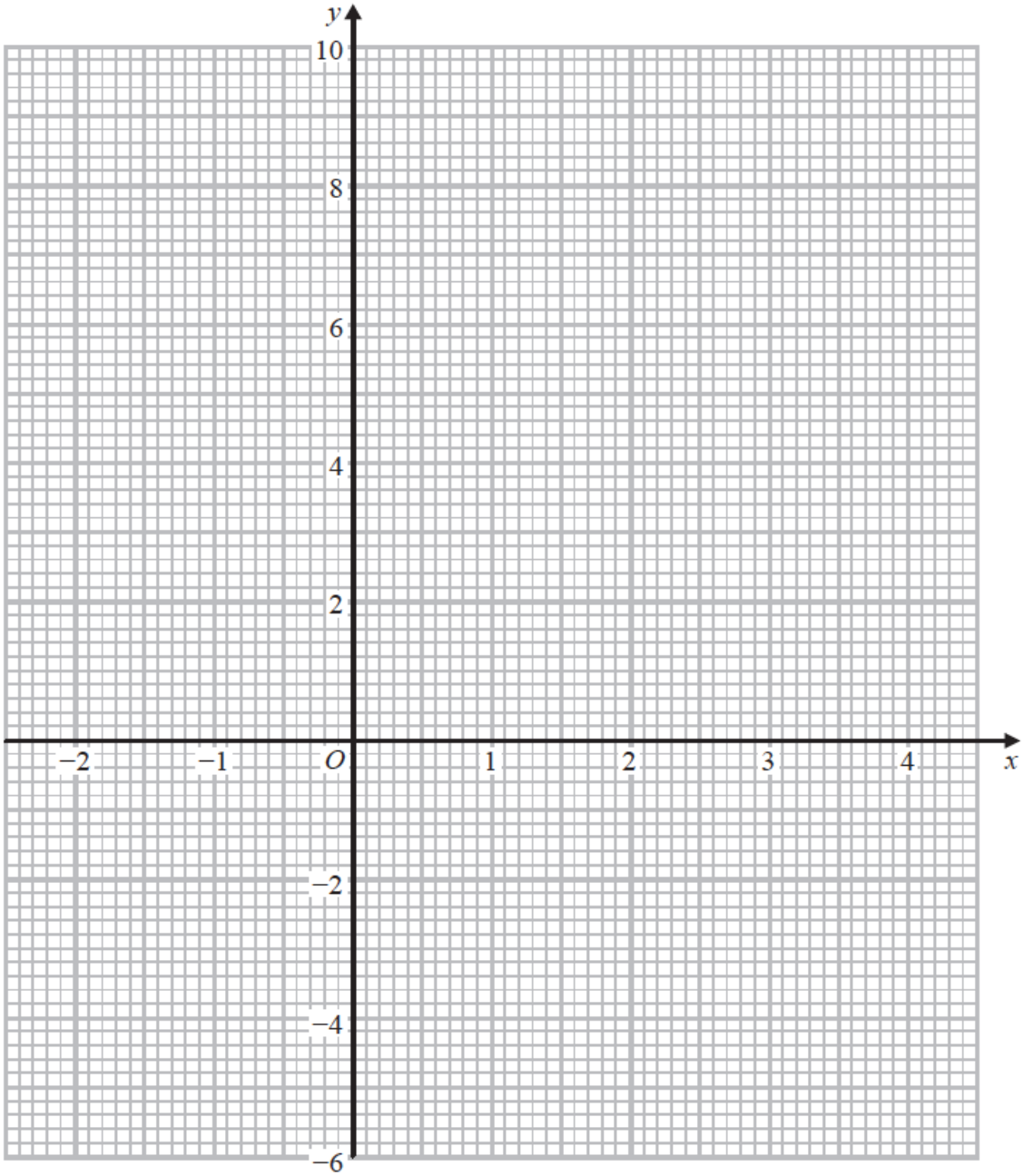
3 (*a*) Complete the table of values for $y = x^2 - 3x - 1$

x	−2	−1	0	1	2	3	4
y			−1		−3		3

(2)

(*b*) On the grid, draw the graph of $y = x^2 - 3x - 1$ for all values of x from −2 to 4



(2)
(Total for Question 3 is 4 marks)

4 Show that $4\frac{2}{3} \div 1\frac{1}{9} = 4\frac{1}{5}$

(Total for Question 4 is 3 marks)

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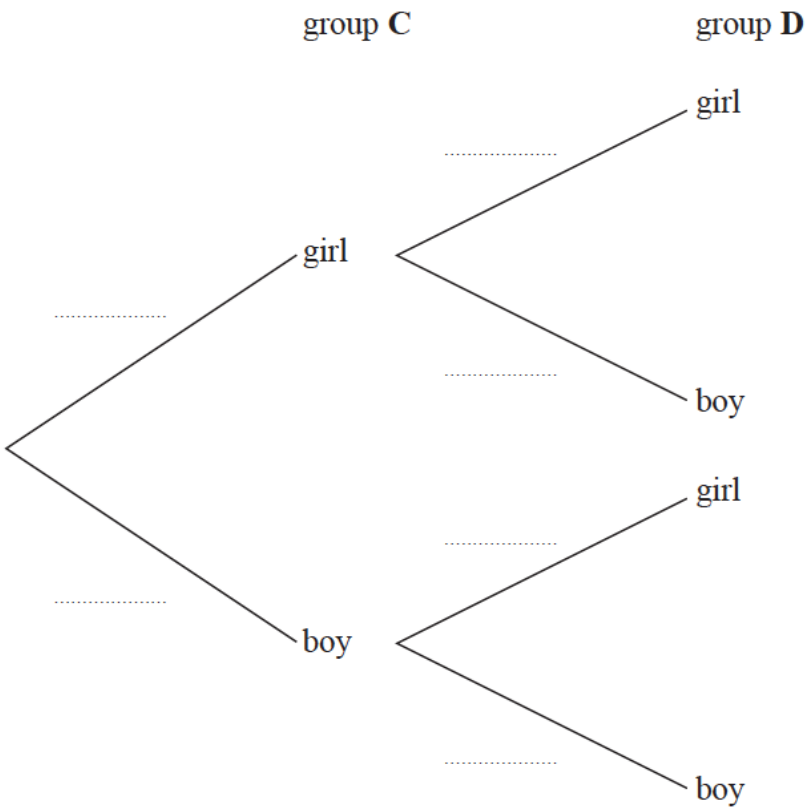
5 In group **C**, there are 6 girls and 8 boys.
In group **D**, there are 3 girls and 7 boys.

A team is made by picking at random one child from group **C** and one child from group **D**.

(*a*) Complete the probability tree diagram.



(2)

(*b*) Work out the probability that there are two boys in the team.

.....

(2)

(Total for Question 5 is 4 marks)

6 Use ruler and compasses to construct the perpendicular bisector of the line *DE*.
You must show all your construction lines.

(Total for Question 6 is 2 marks)

7 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{2, 3, 5, 7\}$

$B = \{4, 6, 8, 10\}$

(*a*) Explain why $A \cap B$ has no elemnts.

.....

.....

.....

(1)

$x \in \mathscr{E}$ and $x \notin A \cup B$

(*b*) Write down the **two** possible values of x.

..... , ...

(1)

Set C is such that

$A \cup B \cup C = \mathscr{E}$

$A \cap C = \{2\}$

$B \cap C' = \{4, 6, 10\}$

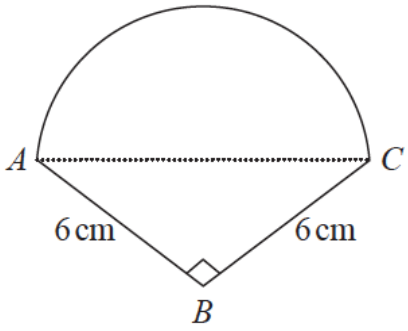
(*c*) List all the members of set C.

.....

(2)

(Total for Question 7 is 4 marks)

8 The diagram shows a shape made from a right-angled triangle and a semicircle.



AC is the diameter of the semicircle.
$BA = BC = 6$ cm
Angle $ABC = 90°$

Work out the area of the shape.
Give your answer correct to 1 decimal place.

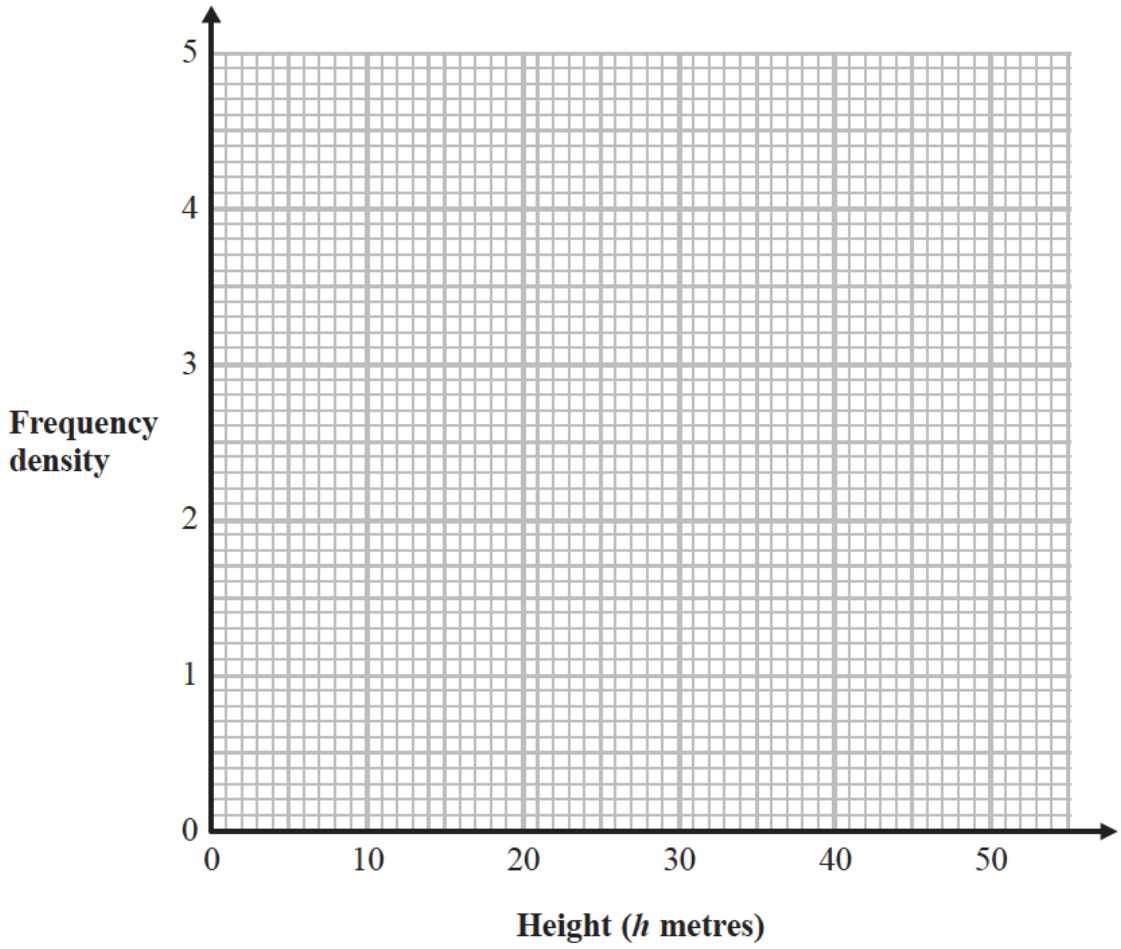
..... cm^2

(Total for Question 8 is 5 marks)

9 The table gives information about the heights of some trees.

Height (h metres)	Frequency
$0 < h \leq 20$	15
$20 < h \leq 35$	48
$35 < h \leq 40$	21
$40 < h \leq 50$	16

On the grid, draw a histogram for this information.



(Total for Question 9 is 3 marks)

10 (*a*) Factorise $2x^2 - 7x + 6$

.....

(2)

(*b*) Solve $\dfrac{4m+9}{3} = 7 - 2m$

Show clear algebraic working.

m = ...

(4)

(*c*) Write $\dfrac{\sqrt[4]{y}}{y}$ in the form y^b where b is a fraction.

…….....

(2)

(Total for Question 10 is 8 marks)

11 $\mathscr{E}$ = {positive integers less than 20}

$A = \{x : x < 12\}$

$B = \{x : 7 \leq x < 16\}$

List the members of $A \cap B$

…….....

(2)

(Total for Question 11 is 2 marks)

12 Becky has a biased 6-sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

Number	1	2	3	4	5	6
Probability	$2x$	0.18	$2x$	$3x$	0.26	x

Becky is going to throw the dice 200 times.

Work out an estimate for the number of times that the dice will land on an even number.

….....

(Total for Question 12 is 4 marks)

13 Make x the subject of the formula $y = \sqrt{\dfrac{3x-2}{x+1}}$

….....

(Total for Question 13 is 4 marks)

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14 $C = b - a$

$a =$ 6 correct to the nearest integer.

$b = 15$ correct to the nearest 5.

Work out the upper bound for the value of C
Show your working clearly.

.....

(Total for Question 14 is 3 marks)

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15 Use algebra to show that the recurring decimal $0.2\dot{5}\dot{4} = \frac{14}{55}$

(Total for Question 15 is 2 marks)

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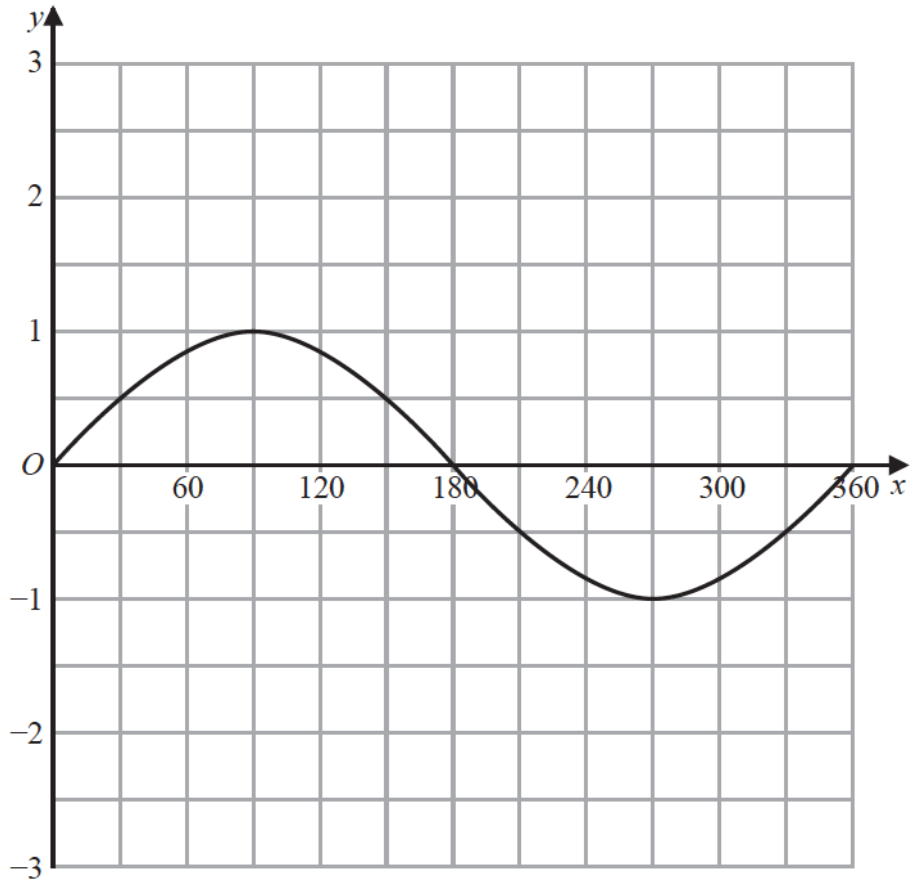
16 Show that $\frac{4+\sqrt{8}}{\sqrt{2}-1}$ can be written in the form $a + b\sqrt{2}$, where a and b are integers.

Show each stage of your working clearly and give the value of a and the value of b.

(Total for Question 16 is 3 marks)

17 The graph of $y = \sin x°$ for $0 \leq x \leq 360$ is drawn on the grid.



(*a*) On the grid, draw the graph of $y = 2 \sin (x + 30)°$ for $0 \leq x \leq 360$

(2)

(*b*) (i) Write $x^2 - 6x + 10$ in the form $(x - a)^2 + b$ where a and b are integers.

.....

(2)

(ii) Hence, describe fully the single transformation that maps the curve with equation $y = x^2$ onto the curve with equation $y = x^2 - 6x + 10$

.....

.....

(2)

(Total for Question 17 is 6 marks)

18 Simplify fully $\dfrac{6x^3 + 13x^2 - 5x}{4x^2 - 25}$

.....

(Total for Question 18 is 3 marks)

19 $ABCD$ is a kite with $AB = AD$ and $CB = CD$.

B is the point with coordinates (10, 19)
D is the point with coordinates (2, 7)

Find an equation of the line AC.
Give your answer in the form $py + qx = r$ where p, q and r are integers.

.....

(Total for Question 19 is 5 marks)

20 $A = 2^n \times 3 \times 5^m$

Write $8A$ as a product of powers of its prime factors.

.....

(Total for Question 20 is 2 marks)

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21 The function f is such that $f(x) = 3x - 2$

(*a*) Find f (5)

.....

(1)

The function g is such that $g(x) = 2x^2 - 20x + 9$ where $x \geqslant 5$

(*b*) Express the inverse function g^{-1} in the form $g^{-1}(x) = ...$

$g^{-1}(x) =$ .....

(4)

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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