GCSE Mathematics Practice Tests: Set 13

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*) Make *a* the subject of $d = g + 2ac$

.....

(2)

(*b*) Factorise fully $9ef - 12f$

.....

(2)

(*c*) Expand and simplify $(x + 2)(x - 5)$

.....

(2)

(*d*) Simplify fully $\dfrac{n^4 \times n^7}{n^5}$

.....

(2)

(Total for Question 1 is 8 marks)

2 Solve the simultaneous equations

$$3x + 5y = 6$$

$$7x - 5y = -11$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 2 is 3 marks)

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3 Solve $x^2 - 5x - 36 = 0$

Show clear algebraic working.

.....

(Total for Question 3 is 3 marks)

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4 (*a*) Write $5^{17} \times 5^{2}$ as a single power of 5

.....

(1)

(*b*) Write 800 as a product of its prime factors.
Show your working clearly.

.....

(2)

(Total for Question 4 is 3 marks)

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5 Three tins, A, B and C, each contain buttons.
Tin A contains x buttons.
Tin B contains 4 times the number of buttons that tin A contains.
Tin C contains 7 fewer buttons than tin A.

The total number of buttons in the three tins is 137

Work out the number of buttons in tin C.

.....

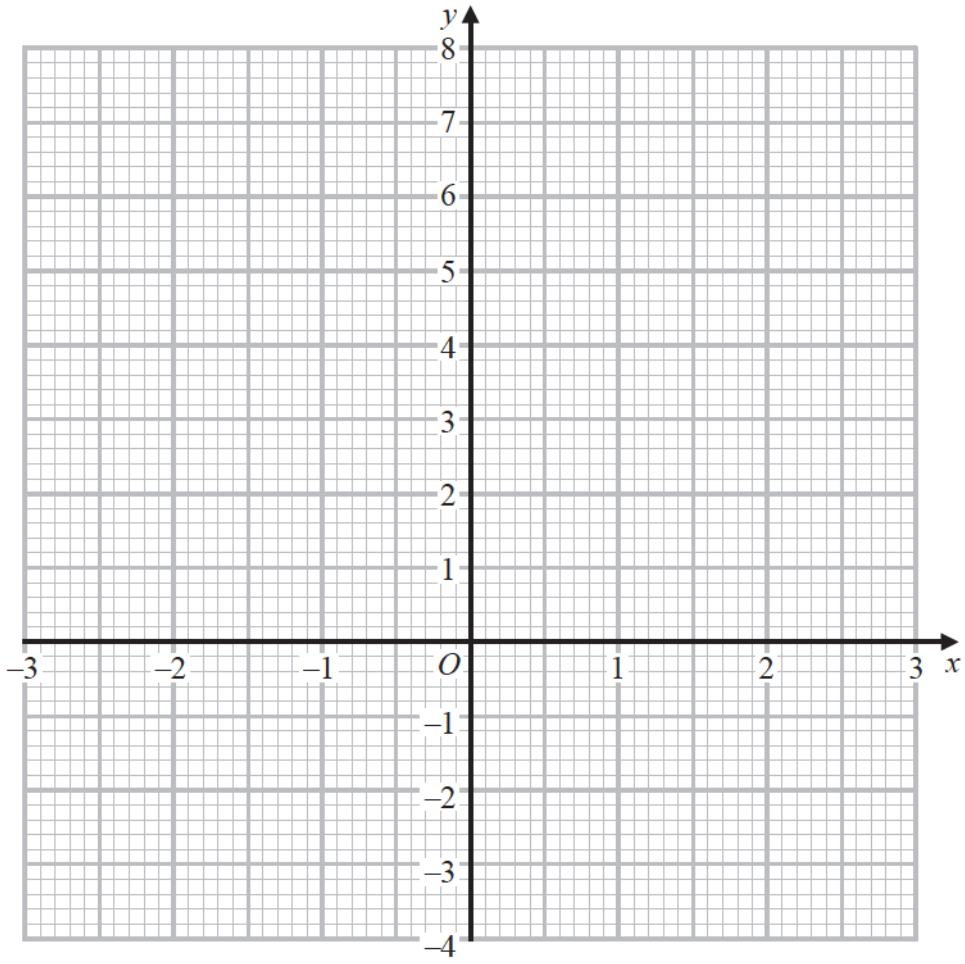
(Total for Question 5 is 4 marks)

6 (*a*) Complete the table of values for $y = x^2 - \frac{x}{2} - 3$

x	–3	–2	–1	0	1	2	3
y	7.5				–2.5		4.5

(2)

(*b*) On the grid, draw the graph of $y = x^2 - \frac{x}{2} - 3$ for values of x from –3 to 3



(2)

(Total for Question 6 is 4 marks)

7 Write down the integer values of x that satisfy the inequality $-2 < x \leq 4$

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(Total for Question 7 is 2 marks)

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8 The function f is such that $f(x) = (x - 4)^2$ for all values of x.

(a) Find f (1)

.....

(1)

The function g is such that $g(x) = \dfrac{4}{x+3}$ $\quad x \neq -3$

(b) Work out fg (2)

.....

(2)

(Total for Question 8 is 3 marks)

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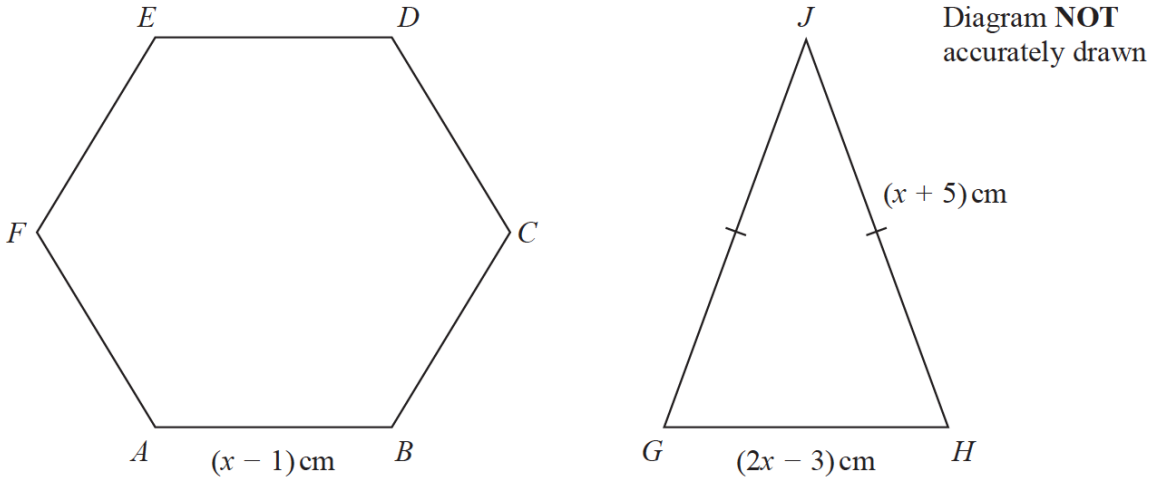
9 The diagram shows a regular hexagon, *ABCDEF*, and an isosceles triangle, *GHJ*.



The perimeter of the hexagon is equal to the perimeter of the triangle.

Find the length of each side of the hexagon.
Show clear algebraic working.

..... cm

(Total for Question 9 is 5 marks)

10 Brendon, Asha and Julie share some money in the ratios 3 : 2 : 6
The **total** amount of money that Asha and Julie receive is £36

Work out the amount of money that Brendon receives.

£.....

(Total for Question 10 is 3 marks)

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11 Show that $3\frac{1}{5} \times 2\frac{5}{8} = 8\frac{2}{5}$

(Total for Question 11 is 3 marks)

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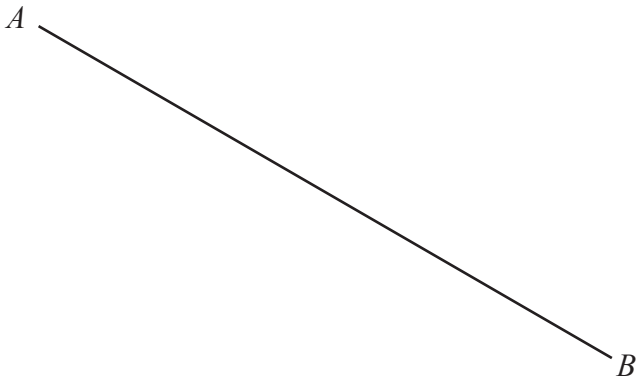
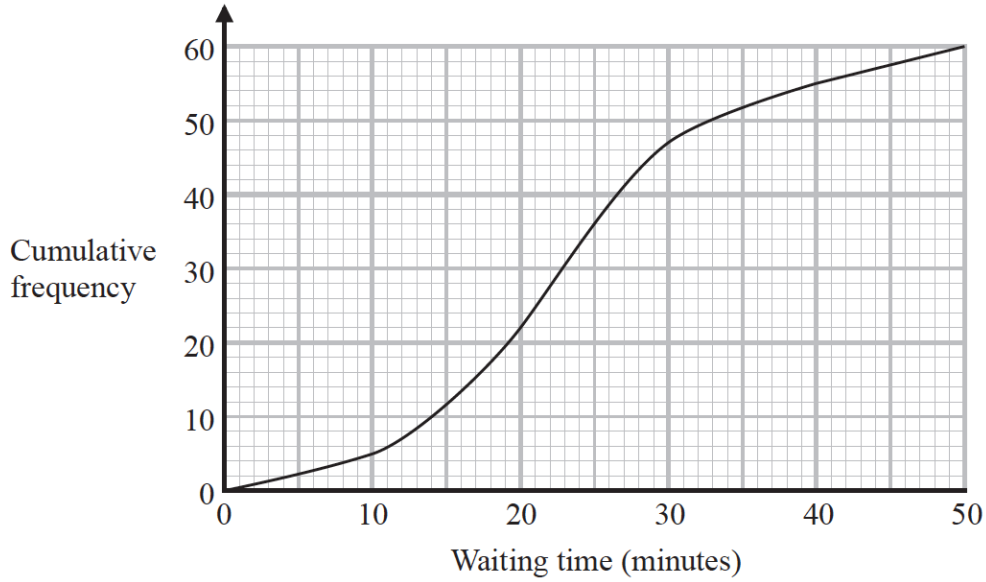
12 Use ruler and compasses only to construct the perpendicular bisector of the line AB.
You must show all your construction lines.



(Total for Question 12 is 2 marks)

13 The cumulative frequency graph gives information about the waiting times, in minutes, of people with appointments at Hospital A.



(*a*) Use the graph to find an estimate of the median waiting time at Hospital A.

..... minutes
(1)

(*b*) Use the graph to find an estimate of the interquartile range of the waiting times at Hospital A.

..... minutes
(2)

At a different hospital, Hospital B, the median waiting time is 28 minutes and the interquartile range of the waiting times is 19 minutes.

(*c*) Compare the waiting times at Hospital A with the waiting times at Hospital B.

.....

.....

.....

.....
(2)

(Total for Question 13 is 5 marks)

14 Max kept a record of the marks he scored in each of the 11 spelling tests he took one term. Here are his marks.

18 5 7 12 11 18 15 16 17 13 14

Find the interquartile range of the marks.

.....

(Total for Question 14 is 3 marks)

15

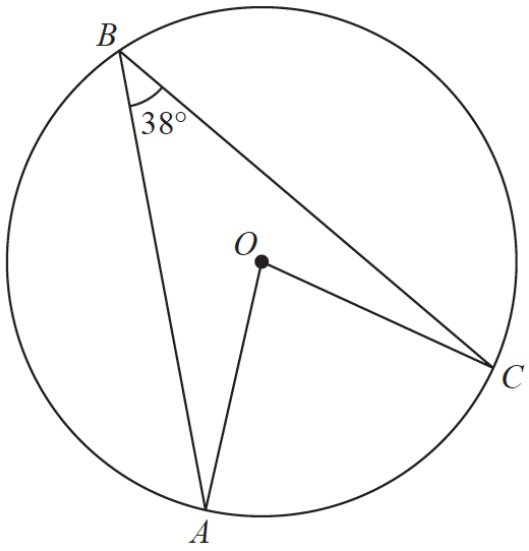


Diagram **NOT** accurately drawn

A, *B* and *C* are points on a circle, centre *O*.
Angle *ABC* = 38°

Work out the size of angle *OAC*.
Give a reason for each stage of your working.

.....°

(Total for Question 15 is 4 marks)

16 Given that y is a prime number,

express $\dfrac{3}{2-\sqrt{y}}$ in the form $\dfrac{a+b\sqrt{y}}{c-y}$ where a, b and c are integers.

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(Total for Question 16 is 2 marks)

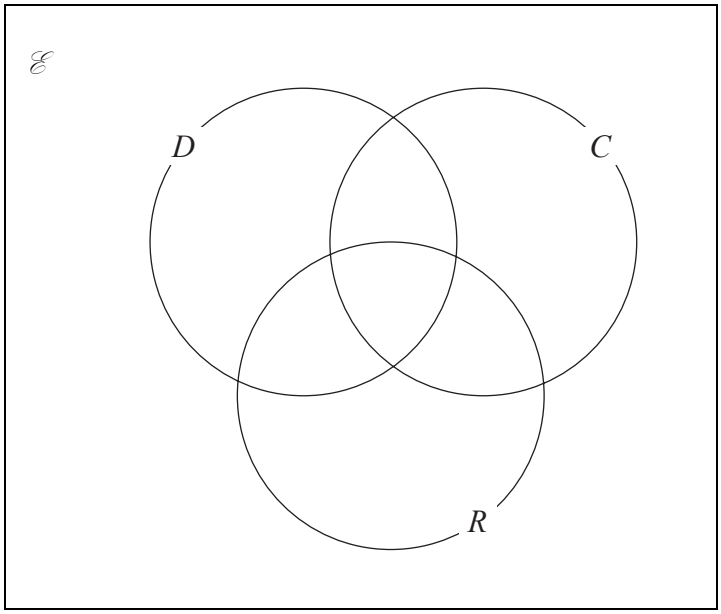
17 Some students in a school were asked the following question.

" Do you have a dog (D), a cat (C) or a rabbit (R)?"

Of these students

28 have a dog
18 have a cat
20 have a rabbit
8 have both a cat and a rabbit
9 have both a dog and a rabbit
x have both a dog and a cat
6 have a dog, a cat and a rabbit
5 have not got a dog or a cat or a rabbit

(a) Using this information, complete the Venn diagram to show the number of students in each appropriate subset.
Give the numbers in terms of x where necessary.



(3)

Given that a total of 50 students answered the question,

(b) work out the value of x.

$x =$ .....

(2)

(Total for Question 17 is 5 marks)

18 (*a*) Simplify fully $\dfrac{10x^2 + 23x + 12}{4x^2 - 9}$

.....

(3)

$2^{2y} \times 2^{3y+2} = \dfrac{8^{5y}}{4^n}$

(*b*) Find an expression for n in terms of y.
Show clear algebraic working and simplify your expression.

.....

(4)

(Total for Question 18 is 7 marks)

19 N is a multiple of 5
$A = N + 1$
$B = N - 1$

Prove, using algebra, that $A^2 - B^2$ is always a multiple of 20

(Total for Question 19 is 3 marks)

20 Express $7 - 12x - 2x^2$ in the form $a + b(x + c)^2$ where a, b and c are integers.

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(Total for Question 20 is 3 marks)

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21 The diagram shows trapezium $OACB$.

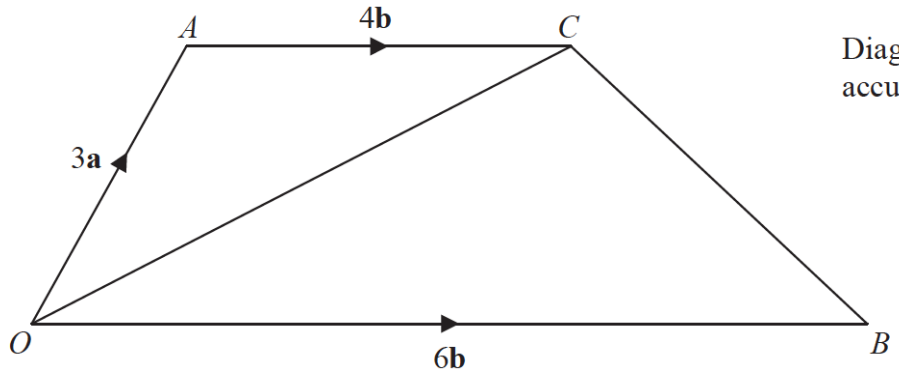

Diagram **NOT** accurately drawn

$\overrightarrow{OA} = 3\mathbf{a}$ $\overrightarrow{OB} = 6\mathbf{b}$ $\overrightarrow{AC} = 4\mathbf{b}$

N is the point on OC such that ANB is a straight line.

Find $\overrightarrow{ON}$ as a simplified expression in terms of **a** and **b**.

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(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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