GCSE Mathematics

Practice Tests: Set 22

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 not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
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Information

- The total mark for this paper is 80
- Questions are in order of mean difficulty as found by students achieving Grade 7.
- 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

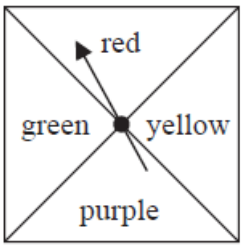
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a biased spinner.



When the spinner is spun once, the probabilities that it lands on red or on yellow or on green are given in the table.

Colour	red	yellow	purple	green
Probability	0.25	0.2	0.2	

(*a*) Work out the probability that the spinner lands on red or on yellow.

.....

(1)

Yang is going to spin the spinner 300 times.

(*b*) Work out an estimate for the number of times the spinner will land on purple.

.....

(3)

(Total for Question 1 is 4 marks)

2 Expand $3c^3(c + 4)$

.....

(Total for Question 2 is 2 marks)

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3 Show that $2\frac{2}{3} + 3\frac{3}{4} = 6\frac{5}{12}$

(Total for Question 3 is 3 marks)

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4 Solve the simultaneous equations

$$3x - 5y = 25$$

$$4x + 3y = 14$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 4 is 4 marks)

5 (a) Factorise $x^2 + 8x - 9$

.....

(2)

(b) Hence, solve $x^2 + 8x - 9 = 0$

.....

(1)

(Total for Question 5 is 5 marks)

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6 Simplify a^0 where $a > 0$

.....

(Total for Question 6 is 1 mark)

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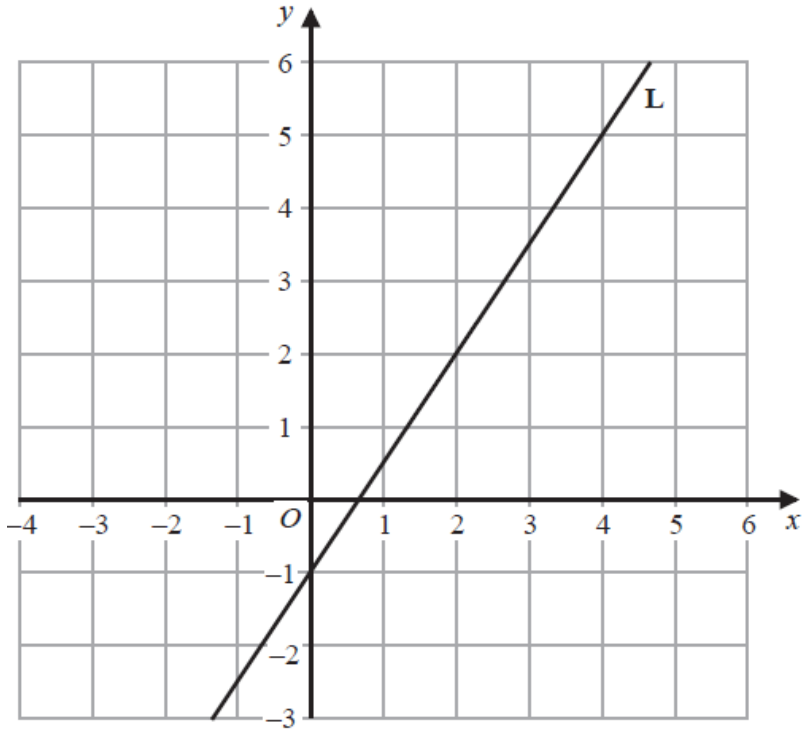
7 Line **L** is drawn on the grid.



Find an equation for **L**
Give your answer in the form $y = mx + c$

.....

(Total for Question 7 is 3 marks)

8 Expand and simplify $(3x - 1)(x + 2)(3x + 1)$

.....

(Total for Question 8 is 3 marks)

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9 Factorise fully $10c^3d^2 + 15cd^4$

.....

(Total for Question 9 is 2 marks)

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10 Simplify fully $\dfrac{3xy^3}{6x^2y}$

.....

(Total for Question 10 is 2 marks)

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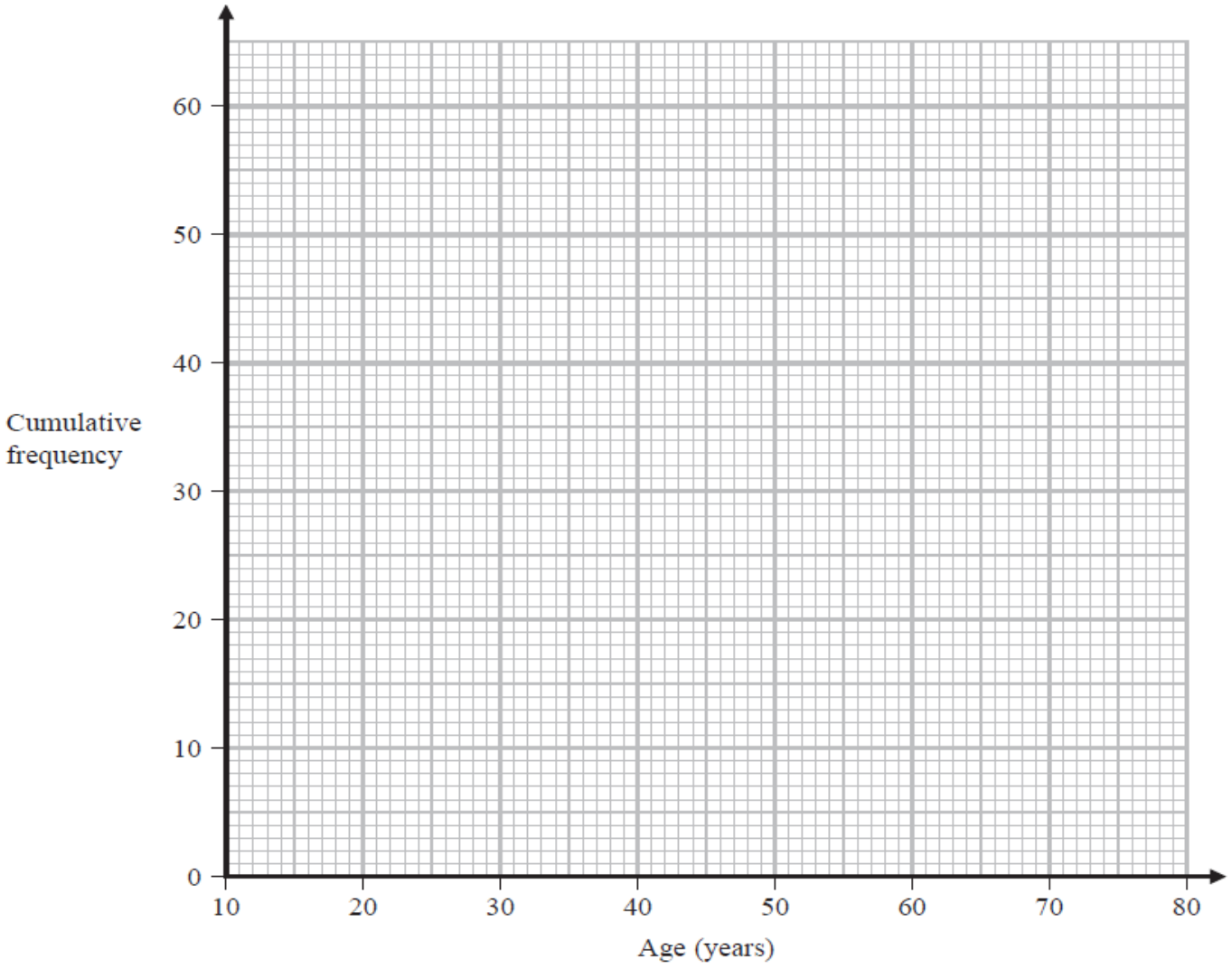
11 The cumulative frequency table shows information about the ages of 60 people who went to a gym on Saturday.

Age (a years)	Cumulative frequency
$10 < a \leq 20$	13
$10 < a \leq 30$	36
$10 < a \leq 40$	42
$10 < a \leq 50$	47
$10 < a \leq 60$	52
$10 < a \leq 70$	56
$10 < a \leq 80$	60

(a) On the grid, draw a cumulative frequency graph for the information in the table.



(2)

(b) Use your graph to find an estimate for the median of the ages of these people.

..... years
(1)

(*c*) Use your graph to find an estimate for the interquartile range of the ages of these people.

..... years
(2)

(*d*) Use your graph to find an estimate for the number of these people who are older than 55 years.

.....

(2)

(Total for Question 11 is 7 marks)

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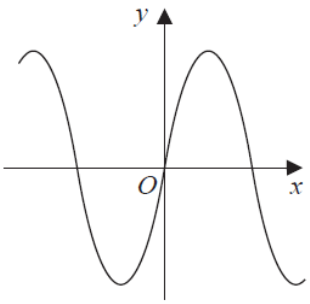
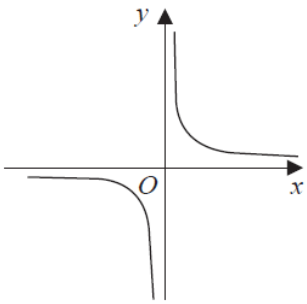
12 Here are nine graphs.

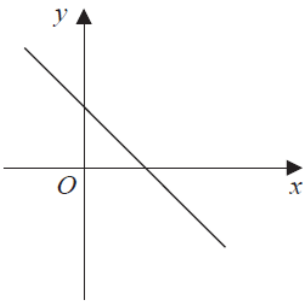
Graph A



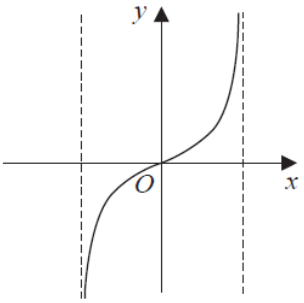
Graph B



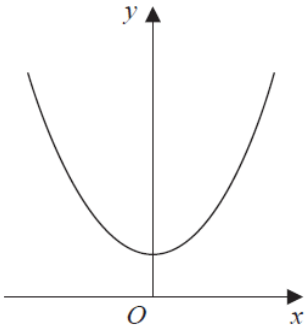
Graph C



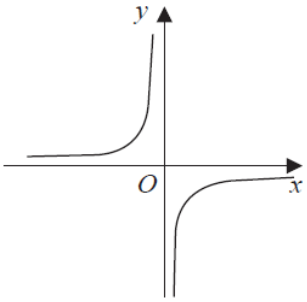
Graph D



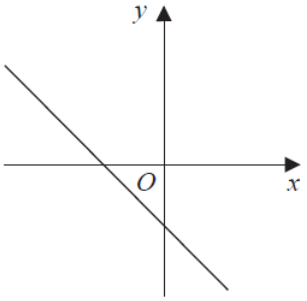
Graph E



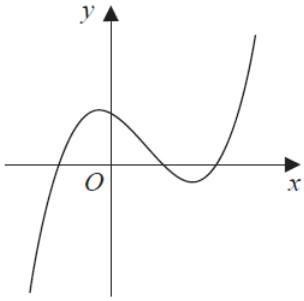
Graph F



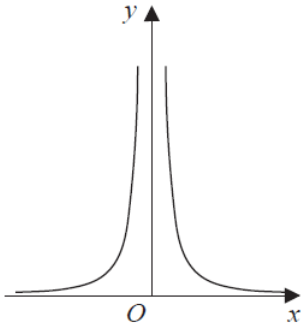
Graph G



Graph H



Graph I



Complete the table below with the letter of the graph that could represent each given equation.
Write each answer on the dotted line.

Equation	Graph
$y = -2x + 3$	.....
$y = -\frac{1}{x}$	.....
$y = \tan x°$	.....
$y = (x + 1)(x - 1)(x - 2)$	.....

(Total for Question 12 is 3 marks)

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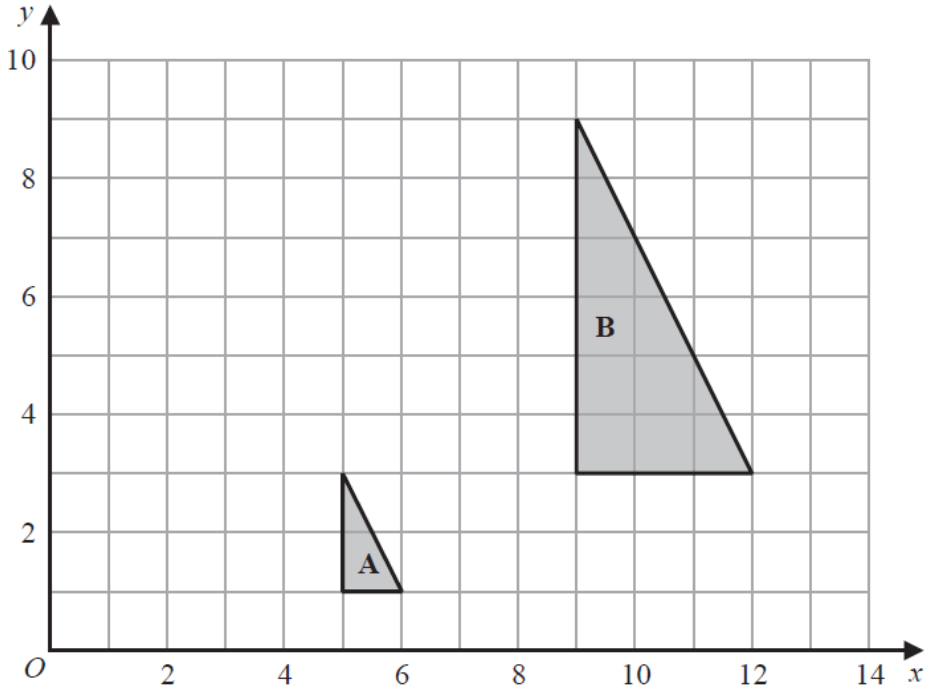
13 Use algebra to show that $0.3\dot{4}\dot{5} = \frac{19}{55}$

(Total for Question 13 is 2 marks)

14



(*a*) Describe fully the single transformation that maps triangle **A** onto triangle **B**

.....

.....

(3)

(*b*) On the grid above, translate triangle **A** by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

Label your triangle **C**

(1)

(Total for Question 14 is 4 marks)

15 Solve the inequality $3 - 4x \leq 11$

.....

(Total for Question 15 is 2 marks)

16 The diagram shows a cube *ABCDEFGH* with sides of length 6 cm.

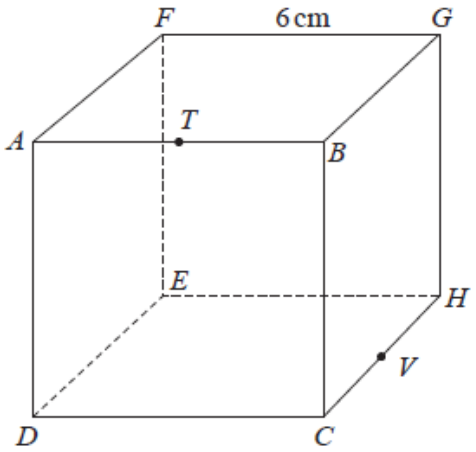


Diagram **NOT** accurately drawn

T is the midpoint of *AB* and *V* is the midpoint of *CH*

Work out the distance from *T* to *V* in a straight line through the cube.
Give your answer in the form *a* cm where *a* is an integer.

..... cm

(Total for Question 16 is 4 marks)

17 Simplify fully $\left(\frac{2x^5}{8xy^2}\right)^{-2}$

.....

(Total for Question 17 is 3 marks)

---

18 Express $2x^2 - 12x + 3$ in the form $a(x + b)^2 + c$ where a, b and c are integers.

.....

(Total for Question 18 is 3 marks)

---

19 $f(x) = x^2 - 4$

$g(x) = 2x + 1$

Solve $fg(x) > 0$
Show clear algebraic working.

.....

(Total for Question 19 is 4 marks)

20 Solve the simultaneous equations

$$x - 2y = 3$$
$$x^2 - y^2 + 2x = 10$$

Show clear algebraic working.

.....

(Total for Question 20 is 5 marks)

21 Express $\left(\frac{20}{x^2-36}-\frac{2}{x-6}\right)\times\frac{1}{4-x}$ as a single fraction in its simplest form.

.....

(Total for Question 21 is 3 marks)

22 $\dfrac{2^k}{4^n} = 2^x$

Find an expression for x in terms of k and n

$x =$ .....

(Total for Question 22 is 2 marks)

23 The point A with coordinates $(-3, 2)$ lies on the straight line with equation $y = f(x)$

(a) Find the coordinates of the image of the point A on the straight line with equation

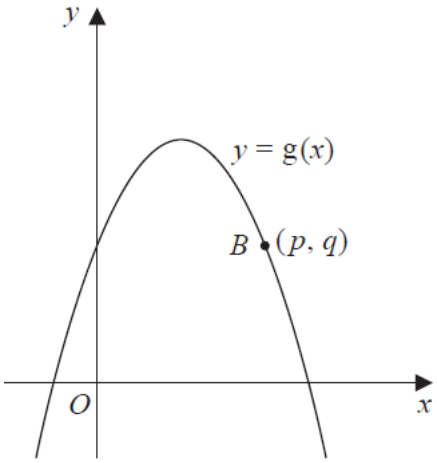
(i) $y = f(x) - 3$

(..... , ...)
(1)

(ii) $y = f(x) + 5$

(..... , ...)
(1)

Here is a sketch of part of the curve with equation $y = g(x)$



The point B with coordinates (p, q) lies on the curve.

(b) Find the coordinates of the image of the point B on the curve with equation

$$y = -g(x - c)$$

where c is a constant.

(..... , ...)
(2)

(Total for Question 23 is 4 marks)

24 Express $\dfrac{3+\sqrt{8}}{\left(\sqrt{2}-1\right)^2}$ in the form $p + \sqrt{q}$ where p and q are integers.

Show each stage of your working clearly.

.....

(Total for Question 24 is 4 marks)

25 Ciara throws **four** fair six-sided dice.

The faces of each dice are labelled with the numbers 1, 2, 3, 4, 5, 6

Work out the probability that at least one of the dice lands on an even number.

.....

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS