

# GCSE Mathematics

## Practice Tests: Set 11

### 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) Simplify  $w^5 \times w^7$

.....

**(1)**

(b) Simplify  $t^9 \div t^3$

.....

**(1)**

**(Total for Question 1 is 2 marks)**

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**2** Solve  $4x - 13 = 17 + 8x$

$x =$  .....

**(Total for Question 2 is 2 marks)**

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3 Show that  $5\frac{2}{3} - 2\frac{3}{4} = 2\frac{11}{12}$

(Total for Question 3 is 3 marks)

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4 Simplify fully  $(x^{12}y^8)^{\frac{3}{4}}$

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

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5  $\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{even numbers}\}$

$B = \{\text{multiples of 3}\}$

List the members of the set

(i)  $A \cap B$

(ii)  $A \cup B$

.....

.....

**(Total for Question 5 is 2 marks)**

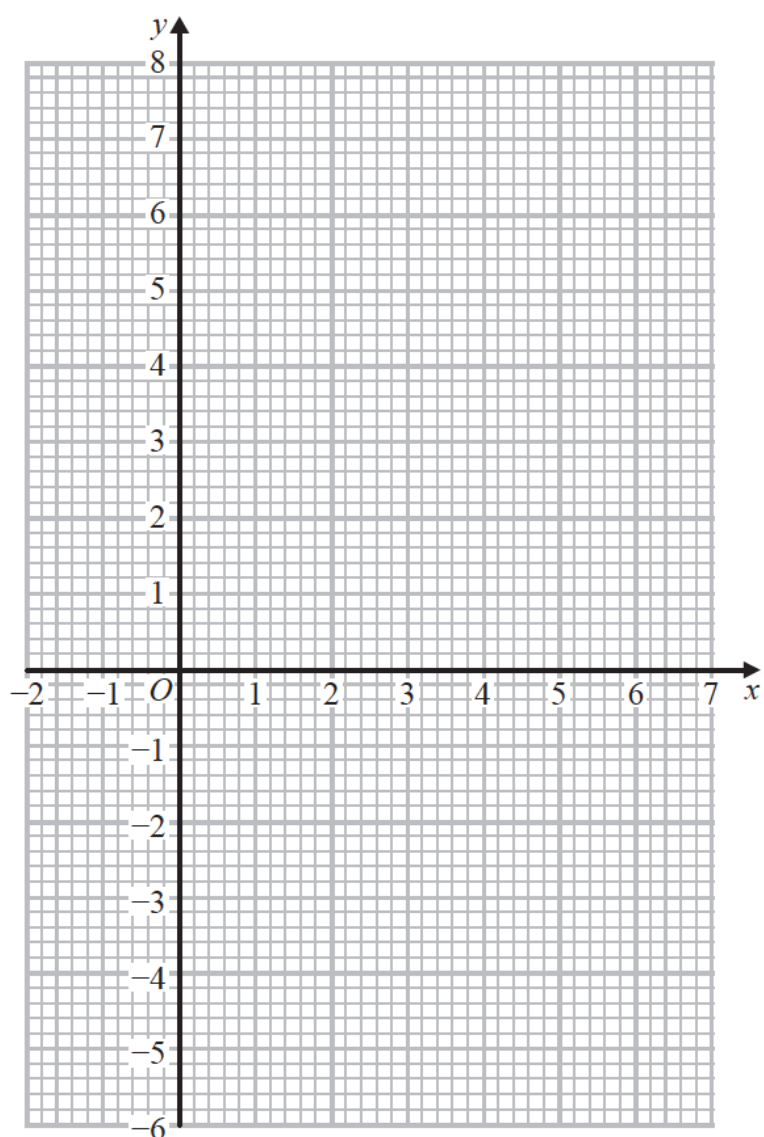


6 (a) Complete the table of values for  $y = 1 + 5x - x^2$

$x$	-1	0	1	2	3	4	5	6
$y$		1		7	7		1	

(2)

(b) On the grid, draw the graph of  $y = 1 + 5x - x^2$  for values of  $x$  from -1 to 6



(2)

(Total for Question 6 is 4 marks)

7 Simplify  $(5xy^2)^3$

.....  
**(Total for Question 7 is 2 marks)**

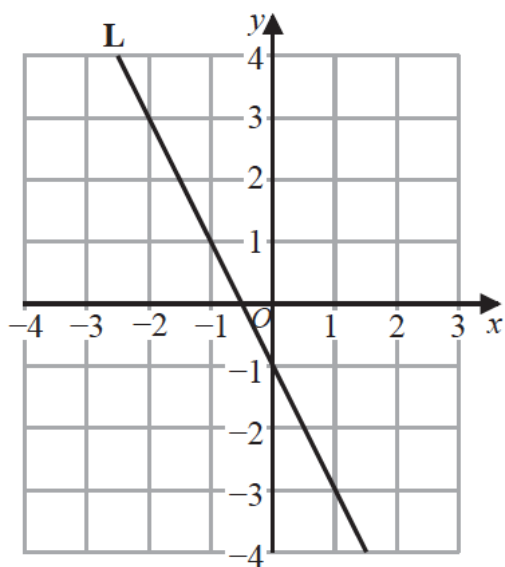
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8 Expand and simplify  $(x + 2)(2x + 3)(x - 7)$   
Show your working clearly.

.....  
**(Total for Question 8 is 3 marks)**

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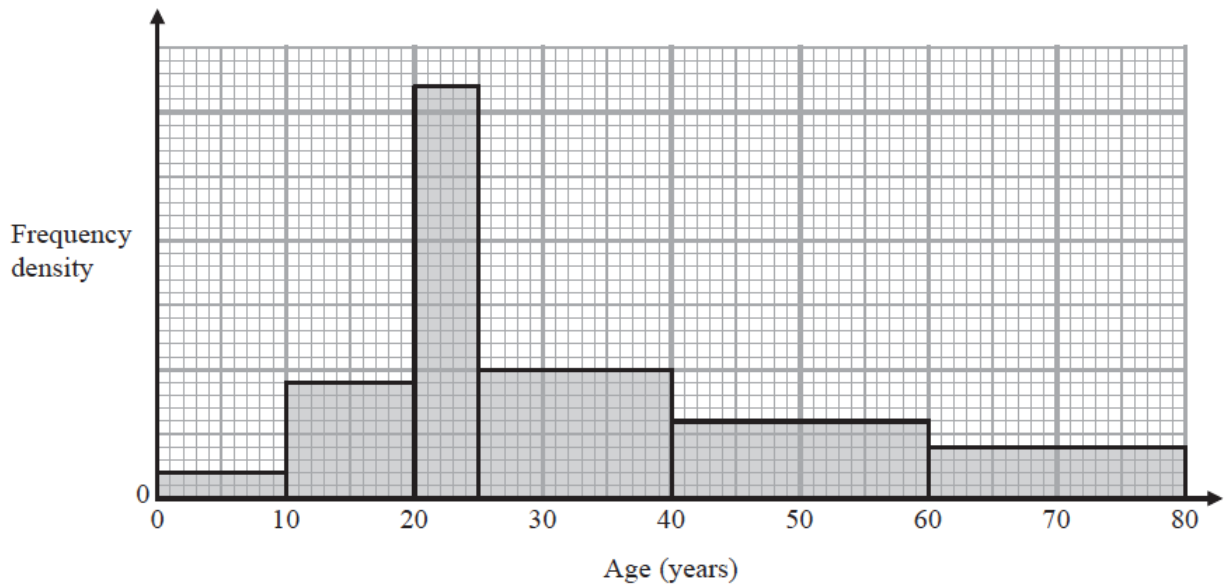
9 Line L is drawn on the grid.



Find an equation for L.

.....  
(Total for Question 9 is 3 marks)

- 10 The histogram shows information about the ages of all the passengers travelling on a plane. No one on the plane is older than 80 years.



24 passengers on the plane are aged between 40 years and 60 years.

- (a) Work out the total number of passengers on the plane.

.....  
(3)

A passenger on the plane is picked at random.

- (b) Work out an estimate for the probability that this person is older than 55 years.

.....  
(2)

**(Total for Question 10 is 5 marks)**

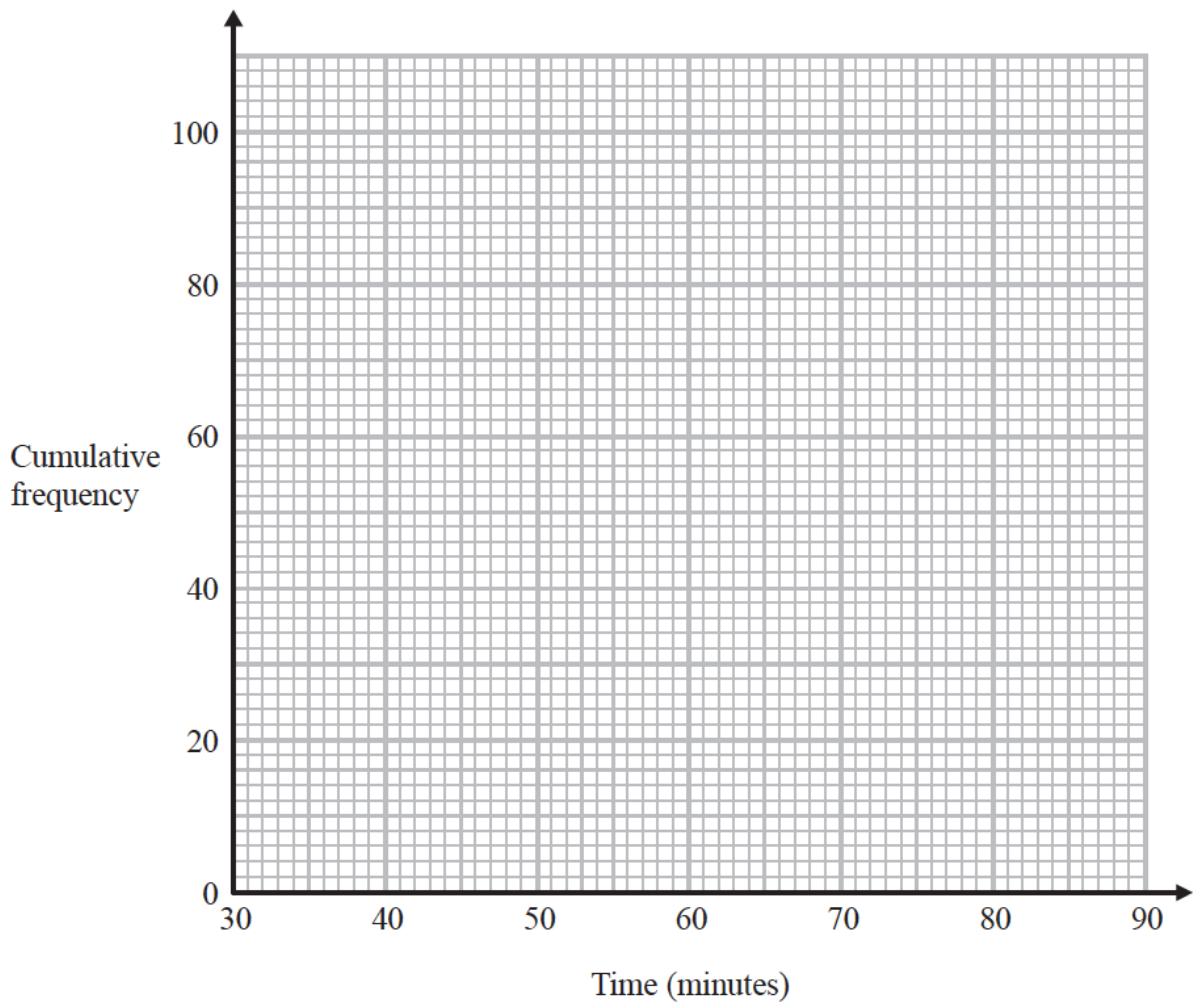


- 11 Sandeep recorded the length of time, in minutes, that each of 100 adults went for a walk one Saturday afternoon.

The cumulative frequency table gives information about these times.

Time ( $t$ minutes)	Cumulative frequency
$30 < t \leq 40$	6
$30 < t \leq 50$	20
$30 < t \leq 60$	56
$30 < t \leq 70$	84
$30 < t \leq 80$	95
$30 < t \leq 90$	100

- (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 length of time that these adults went for a walk.

..... minutes  
**(2)**

One of the 100 adults is chosen at random.

- (c) Use your graph to find an estimate for the probability that this adult went for a walk for more than 72 minutes.

.....  
**(3)**

**(Total for Question 11 is 7 marks)**

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**12** Solve the simultaneous equations

$$2x^2 + 3y^2 = 5$$

$$y = 2x + 1$$

Show clear algebraic working.

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**(Total for Question 12 is 5 marks)**

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13 Make  $m$  the subject of  $p^2 = \frac{x+m}{2m-y}$

.....  
**(Total for Question 13 is 3 marks)**

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14 The straight line  $L_1$  has equation  $2y = 6x - 5$

The straight line  $L_2$  is perpendicular to  $L_1$  and passes through the point  $(9, -1)$

Find an equation for  $L_2$

Give your answer in the form  $ay + bx = c$

.....  
**(Total for Question 14 is 4 marks)**

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15 A curve has equation  $y = f(x)$

There is only one maximum point on the curve.

The coordinates of this maximum point are  $(4, 3)$

Write down the coordinates of the maximum point on the curve with equation

(i)  $y = f(x - 5)$

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

(ii)  $y = 3f(x)$

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

**(Total for Question 15 is 2 marks)**

16 The functions  $f$  and  $g$  are defined as

$$f(x) = \frac{x}{4x-3} \quad \text{and} \quad g(x) = x - 5$$

(a) State which value of  $x$  must be excluded from any domain of the function  $f$ .

.....  
**(1)**

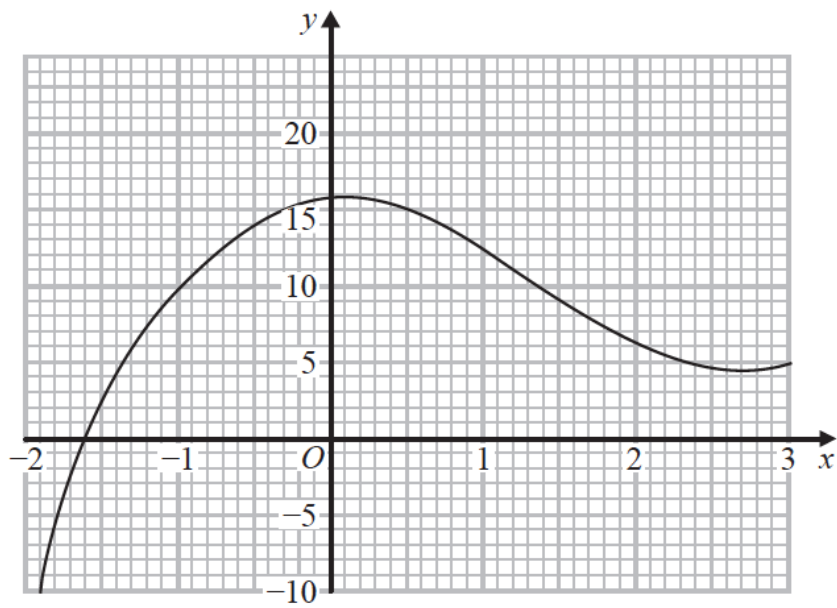
(b) Find  $fg(x)$ .  
Simplify your answer.

$fg(x) = \dots\dots\dots$   
**(2)**

(c) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) = \dots$

$f^{-1}(x) = \dots\dots\dots$   
**(3)**

Part of the curve with equation  $y = h(x)$  is shown on the grid.



- (d) Find an estimate for the gradient of the curve at the point where  $x = -0.5$ .  
Show your working clearly.

.....  
(3)  
(Total for Question 16 is 9 marks)

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17 Given that  $3^n = \frac{3^x}{9^y}$ , find an expression for  $n$  in terms of  $x$  and  $y$ .

$n = \dots\dots\dots$

**(Total for Question 14 is 2 marks)**

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- 18** A box contains marbles.  
4 of the marbles are red.  
The rest of the marbles are yellow.

Antonia takes at random a marble from the box and does not replace it.  
Sergio then takes at random a marble from the box.

The probability that Antonia and Sergio both take a yellow marble is 0.7

Work out how many marbles were originally in the box.  
Show your working clearly.

.....  
**(Total for Question 18 is 5 marks)**

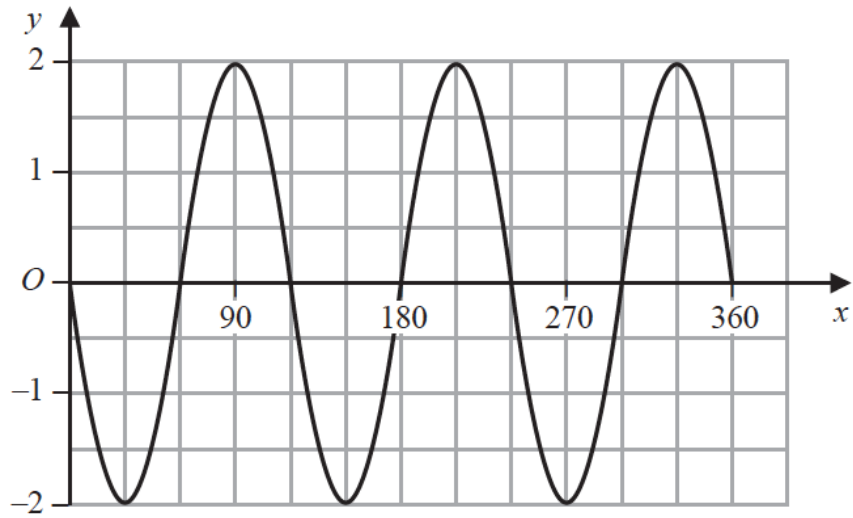
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**19** Write  $5 + 12x - 2x^2$  in the form  $a + b(x + c)^2$  where  $a$ ,  $b$  and  $c$  are integers.

.....  
**(Total for Question 19 is 4 marks)**

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20 Here is the graph of  $y = a \sin (bx)^\circ$  for  $0 \leq x \leq 360$



Find the value of  $a$  and the value of  $b$ .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

**(Total for Question 20 is 2 marks)**

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21 The table gives information about the first six terms of a sequence of numbers.

<b>Term number</b>	1	2	3	4	5	6
<b>Term of sequence</b>	$\frac{1 \times 2}{2}$	$\frac{2 \times 3}{2}$	$\frac{3 \times 4}{2}$	$\frac{4 \times 5}{2}$	$\frac{5 \times 6}{2}$	$\frac{6 \times 7}{2}$

Prove algebraically that the sum of any two consecutive terms of this sequence is always a square number.

**(Total for Question 21 is 4 marks)**

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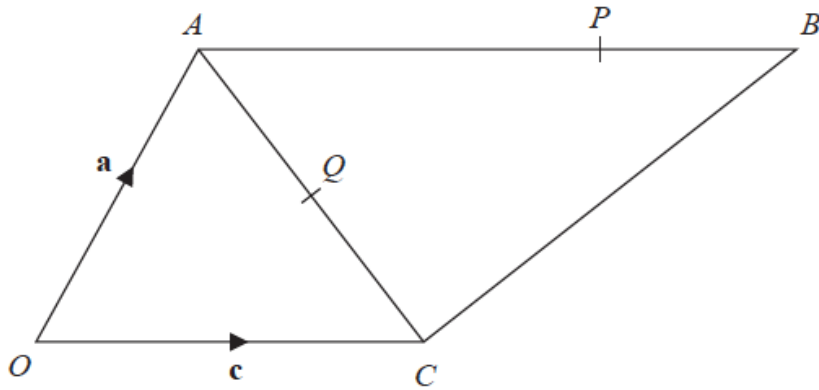


Diagram **NOT**  
accurately drawn

$$\vec{OA} = \mathbf{a} \quad \vec{OC} = \mathbf{c} \quad \vec{AB} = 2\mathbf{c}$$

$P$  is the point on  $AB$  such that  $AP : PB = 3 : 1$   
 $Q$  is the point on  $AC$  such that  $OQP$  is a straight line.

Use a vector method to find  $AQ : QC$   
 Show your working clearly.

$$AQ : QC = \dots\dots\dots$$

(Total for Question 22 is 5 marks)

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**TOTAL FOR PAPER IS 80 MARKS**

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