

GCSE Mathematics

Practice Tests: Set 15

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 $G = c^2 - 4c$

Find the value of G when $c = -5$

$G = \dots\dots\dots$

(Total for Question 1 is 2 marks)

2 Solve $\frac{5x-3}{4} = 2x+3$

Show clear algebraic working.

$x = \dots\dots\dots$

(Total for Question 2 is 3 marks)

3 Given that $150^x = 1$

(a) write down the value of x .

$x = \dots\dots\dots$
(1)

Given that $3^{-8} \div 3^{-6} = 3^n$

(b) find the value of n .

$n = \dots\dots\dots$
(1)

(Total for Question 3 is 2 marks)

4 Solve the simultaneous equations

$$7x + 2y = 5.5$$

$$3x - 5y = 17$$

Show clear algebraic working.

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(Total for Question 4 is 4 marks)

5 (a) Factorise $x^2 - x - 42$

.....
(2)

(b) Solve the inequality $3x + 15 < 8x + 3$

Show clear algebraic working.

.....
(3)

(Total for Question 5 is 5 marks)

6 Expand and simplify $(4x + 1)(x - 3)(5x + 6)$

.....
(Total for Question 6 is 3 marks)

- 7 The frequency table gives information about the ages of the 80 people in a train carriage.

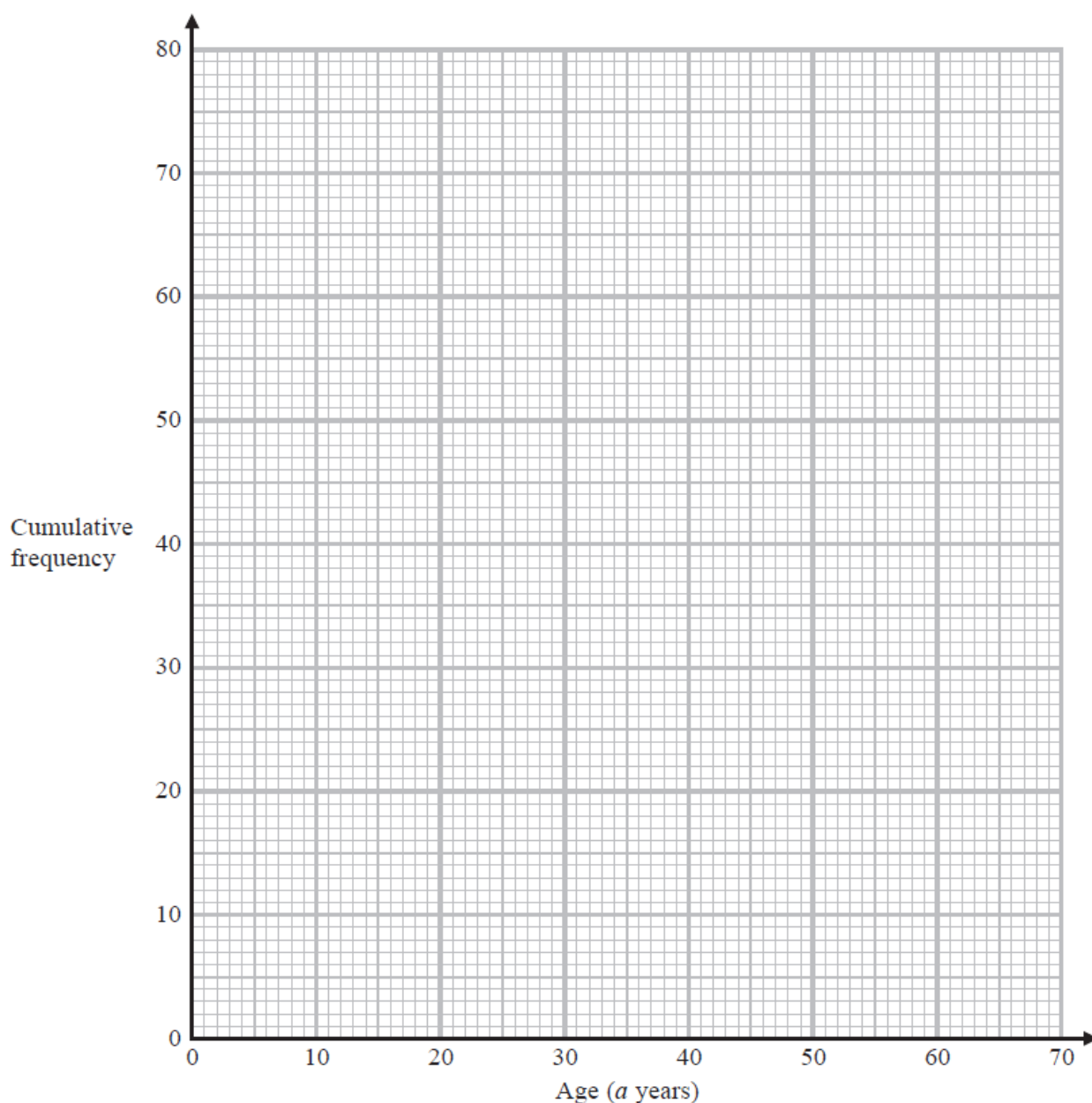
Age (a years)	Frequency
$0 < a \leq 20$	9
$20 < a \leq 30$	19
$30 < a \leq 40$	17
$40 < a \leq 50$	18
$50 < a \leq 60$	13
$60 < a \leq 70$	4

- (a) Complete the cumulative frequency table.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	
$0 < a \leq 30$	
$0 < a \leq 40$	
$0 < a \leq 50$	
$0 < a \leq 60$	
$0 < a \leq 70$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the median age of the people in the train carriage.

..... years
(2)

(Total for Question 7 is 5 marks)

8 Show that $3\frac{3}{4} \times \frac{7}{9} = 2\frac{11}{12}$

(Total for Question 8 is 3 marks)

9 The length of a book is 33.8 cm, correct to one decimal place.

(a) Write down the lower bound of the length of the book.

..... cm
(1)

(b) Write down the upper bound of the length of the book.

..... cm
(1)

(Total for Question 9 is 2 marks)

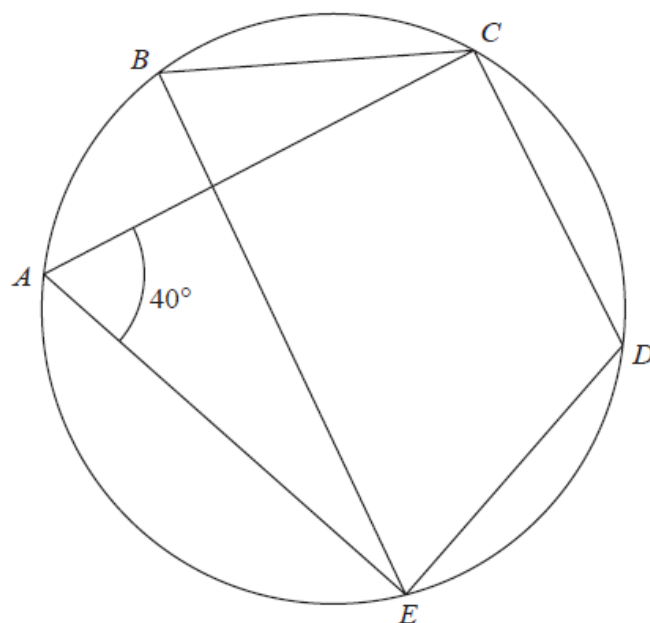


Diagram **NOT**
accurately drawn

A, B, C, D and E are points on a circle.

Angle $EAC = 40^\circ$

(a) (i) Write down the size of angle EBC .

.....[°]
(1)

(ii) Give a reason for your answer.

.....
(1)

(b) Find the size of angle EDC .

.....[°]
(1)

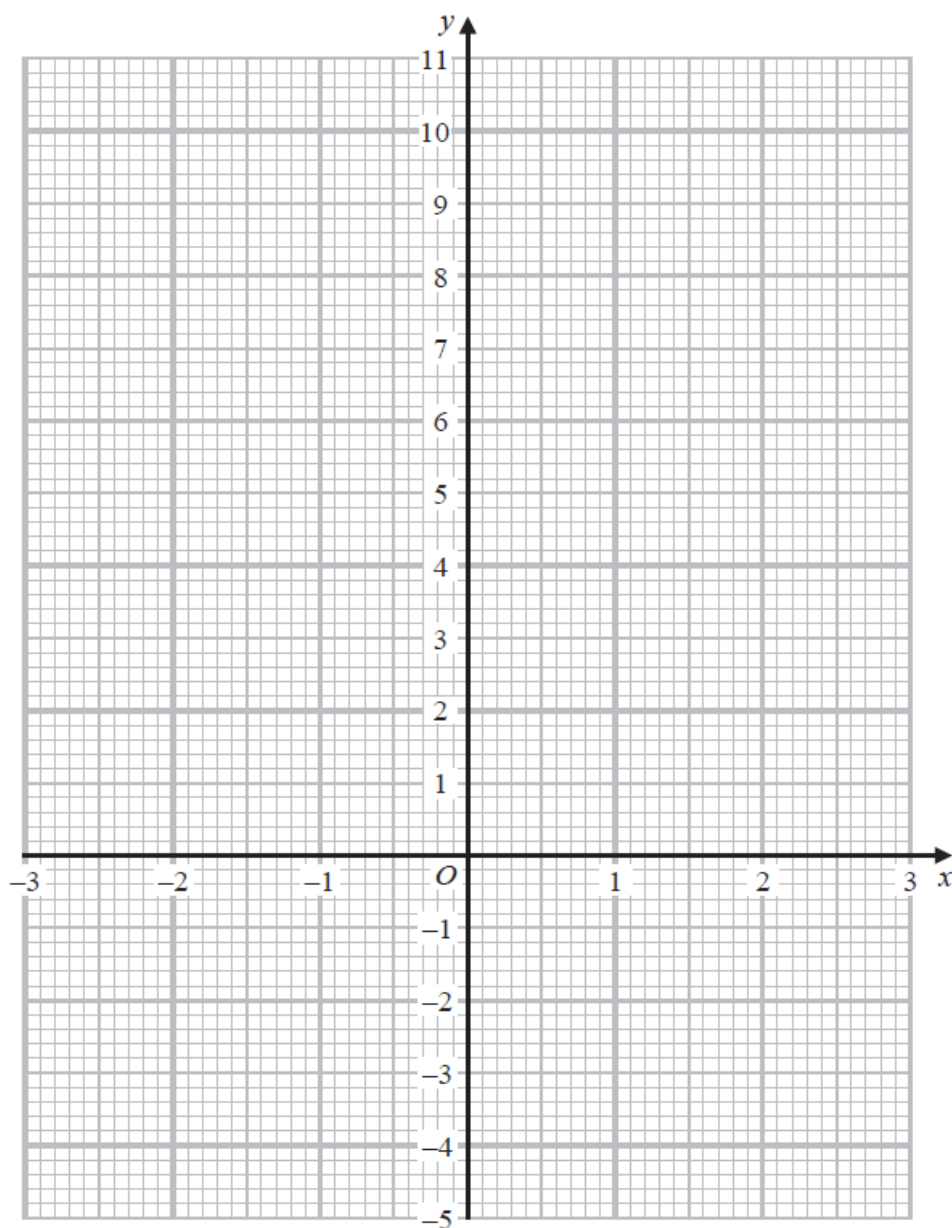
(Total for Question 10 is 3 marks)

- 11 (a) Complete the table of values for $y = \frac{1}{2}x^3 - 2x + 3$

x	-3	-2	-1	0	1	2	3
y	-4.5			3		3	

(2)

- (b) On the grid, draw the graph of $y = \frac{1}{2}x^3 - 2x + 3$ for $-3 \leq x \leq 3$



(2)

- (c) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $\frac{1}{2}x^3 - x + 4 = 0$

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

(Total for Question 11 is 6 marks)

- 12** Given that $n > 0$

make n the subject of the formula $y = \frac{n^2 + d}{n^2}$

$\dots\dots\dots$
(Total for Question 12 is 4 marks)

13 T is inversely proportional to m^2

$T = 30$ when $m = 0.5$

(a) Find a formula for T in terms of m .

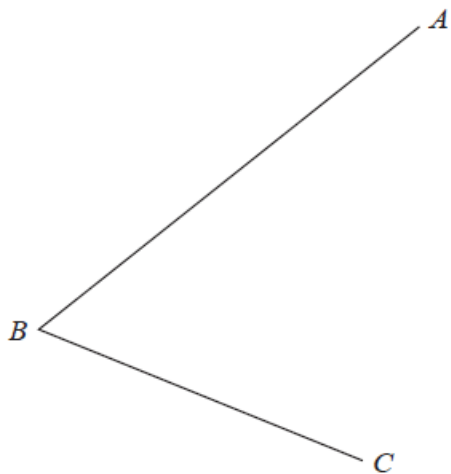
.....
(3)

(b) Work out the value of T when $m = 0.1$

.....
(1)

(Total for Question 13 is 4 marks)

- 14** Using ruler and compasses only, construct the bisector of angle ABC .
You must show all your construction lines.



(Total for Question 14 is 2 marks)

- 15** Write $7 + 12x - 3x^2$ in the form $a + b(x + c)^2$ where a , b and c are integers.

.....
(Total for Question 15 is 4 marks)

16 The functions f and g are defined as

$$f(x) = 5x - 7 \quad \text{and} \quad g(x) = \frac{5x}{x+4}$$

(a) Find $gf(2.6)$

.....
(2)

(b) Solve $fg(x) = 2$

$x =$
(3)

(c) Find the inverse function g^{-1}

$g^{-1} =$
(3)

(Total for Question 16 is 8 marks)

- 17** The curve with equation $x^2 - x + y^2 = 10$ and the straight line with equation $x - y = -4$ intersect at the points A and B .

Work out the exact length of AB .

Show your working clearly and give your answer in the form $\frac{\sqrt{a}}{2}$ where a is an integer.

.....
(Total for Question 17 is 6 marks)

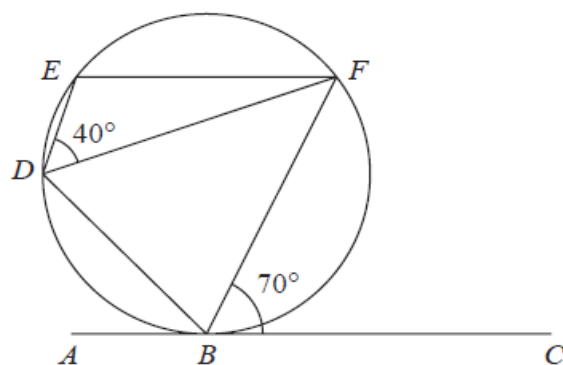


Diagram **NOT**
accurately drawn

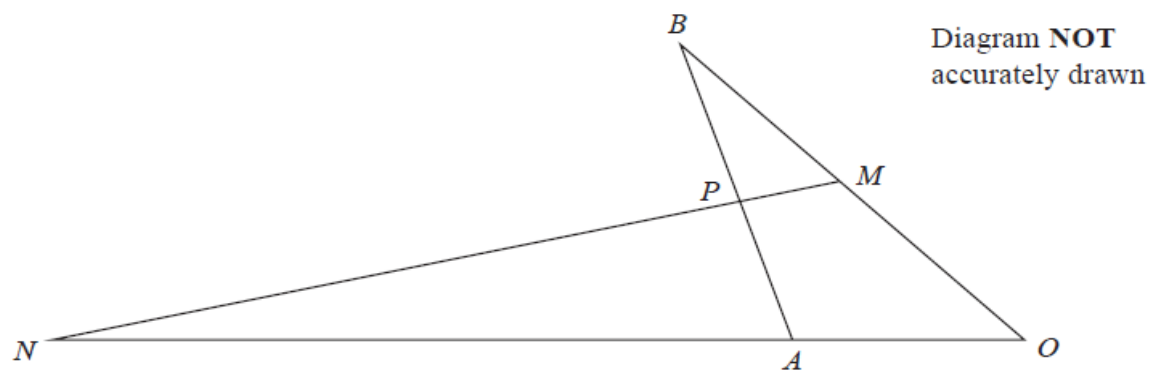
B, D, E and F are points on a circle.
 ABC is the tangent to the circle at B .

Angle $EDF = 40^\circ$

Angle $FBC = 70^\circ$

Prove that the tangent ABC is parallel to EF .
Give a reason for each stage of your working.

(Total for Question 18 is 4 marks)



OAN , OMB , APB and MPN are straight lines.

$$OA : AN = 1 : 4$$

$$OM : MB = 1 : 1$$

$$\vec{OA} = 2\mathbf{a} \quad \vec{OB} = 2\mathbf{b}$$

By using a vector method, find the ratio $AP : PB$
Give your answer in its simplest form.

.....
(Total for Question 19 is 5 marks)

21 Given that $M = \frac{18^{4n} \times 2^{3(n^2-6n)} \times 3^{2(1-4n)}}{12^2}$

find the values of n for which $M = 2$

.....
(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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