

GCSE Mathematics

Practice Tests: Set 16

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 2 840 000 000 in standard form.

.....
(1)

(b) Write 2.5×10^{-4} as an ordinary number.

.....
(1)

(Total for Question 1 is 2 marks)

2 (a) Factorise fully $15y^4 + 20uy^3$

.....
(2)

(b) Solve $4 - 3x = \frac{5 - 8x}{4}$

Show clear algebraic working.

$x =$
(3)

(Total for Question 2 is 5 marks)

3 (a) Simplify $(2x^3y^5)^4$

.....
(2)

(b) (i) Factorise $x^2 + 5x - 36$

.....
(2)

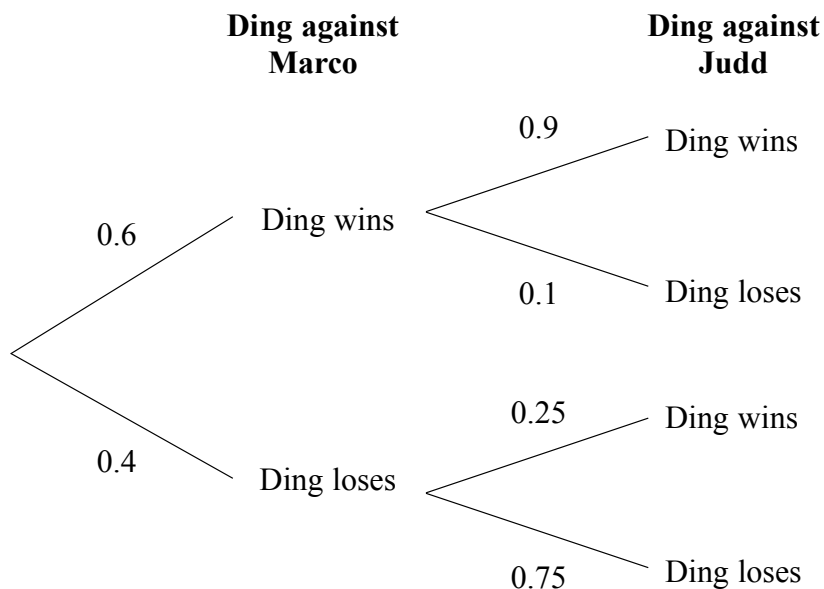
(ii) Hence, solve $x^2 + 5x - 36 = 0$

.....
(1)

(Total for Question 3 is 5 marks)

- 4 Ding is going to play one game of snooker against each of two of his friends, Marco and Judd.

The probability tree diagram gives information about the probabilities that Ding will win or lose each of these two games.



- (a) Work out the probability that Ding will win both games.

.....
(2)

- (b) Work out the probability that Ding will win exactly one of the games.

.....
(3)

(Total for Question 4 is 5 marks)

5 (a) Expand and simplify $4x(2x + 5) - 3x(2x - 3)$

.....
(2)

Given that $\frac{y^5 \cdot y^n}{y^6} = y^{13}$

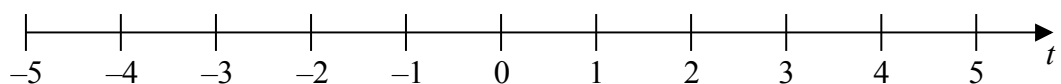
(b) work out the value of n .

$n =$
(2)

(c) (i) Solve the inequality $7t - 8 < 2t + 7$

.....
(2)

(ii) On the number line below, represent the solution set of the inequality solved in part (c)(i)



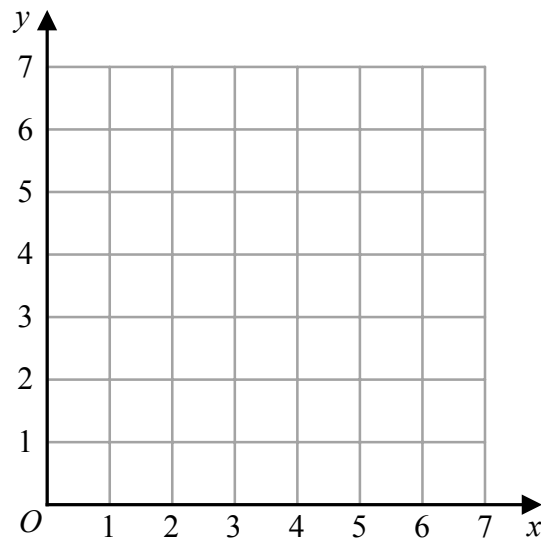
(1)

(Total for Question 5 is 7 marks)

6 Expand and simplify $2x(x - 5)(x - 3)$

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

7



(a) On the grid, draw and **label** the straight line with equation

(i) $x = 1.5$

(ii) $y = x$

(iii) $x + y = 6$

(3)

(b) Show, by shading on the grid, the region that satisfies **all three** of the inequalities

$$x \geq 1.5$$

$$y \geq x$$

$$x + y \leq 6$$

Label the region **R**.

(1)

(Total for Question 7 is 4 marks)

8 $\mathcal{E} = \{20, 21, 22, 23, 24, 25, 26, 27, 28, 29\}$

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

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

List the members of the set

(i) $A \cap B$

.....
(1)

(ii) $A \cup B$

.....
(1)

(Total for Question 8 is 2 marks)

9 Ava writes down five whole numbers.

For these five numbers

the median is 7

the mode is 8

the range is 5

Find a possible value for each of the five numbers that Ava writes down.

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

- 10 Make c the subject of the formula $p = \sqrt{\frac{ac + 8}{3 + c}}$

.....
(Total for Question 10 is 4 marks)

- 11 Point A has coordinates $(5, 8)$
Point B has coordinates $(9, -4)$
(a) Work out the gradient of AB .

.....
(2)

The straight line L has equation $y = -4x + 5$

- (b) Write down the gradient of a straight line that is perpendicular to L .

.....
(1)

(Total for Question 11 is 3 marks)

12

$$A = 2^3 \times 3^2 \times 5^2 \times 11$$

$$B = 2^4 \times 3 \times 5^4 \times 13$$

Find the lowest common multiple (LCM) of A and B .
Give your answer as a product of powers of prime numbers.

.....
(Total for Question 12 is 2 marks)

13 Express $\frac{4}{x-2} - \frac{3}{x+1}$ as a single fraction.

Give your answer in its simplest form.

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

14 Some students were asked the following question.

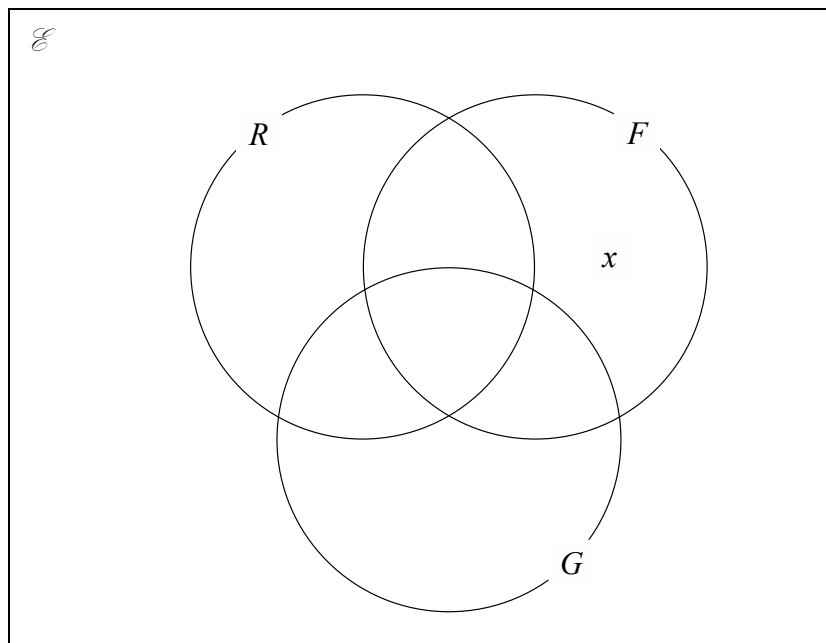
“Which of the subjects Russian (R), French (F) and German (G) do you study?”

Of these students

- 4 study all three of Russian, French and German
- 10 study Russian and French
- 13 study French and German
- 6 study Russian and German
- 24 study German
- 11 study none of the three subjects
- the number who study Russian only is twice the number who study French only.

Let x be the number of students who study French only.

(a) Show all this information on the Venn diagram, giving the number of students in each appropriate subset, in terms of x where necessary.



(3)

Given that the number of students who were asked the question was 80

(b) work out the number of these students that study Russian.

.....
(3)

(Total for Question 14 is 6 marks)

15 Simplify fully $\left(\frac{9t^4w^9}{18t^6w^{10}}\right)^{-2}$

.....
(Total for Question 15 is 3 marks)

16 15 people were asked how long, in minutes, they had been waiting for a bus.
Here are the results.

2 3 3 4 5 6 6 8 9 10 11 13 14 15 18

Find the interquartile range of these times.

..... minutes
(Total for Question 16 is 2 marks)

- 17 Show that $\frac{2}{6 - 3\sqrt{2}}$ can be written in the form $\frac{a + \sqrt{a}}{b}$ where a and b are integers.

Show your working clearly.

(Total for Question 17 is 3 marks)

- 18** Given that $(8 - \sqrt{x})(5 + \sqrt{x}) = y\sqrt{x} + 21$ where x is a prime number and y is an integer, find the value of x and the value of y .

Show each stage of your working clearly.

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(Total for Question 18 is 3 marks)

19 (a) Write down the value of y^0

.....
(1)

(b) Work out $\frac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$

Give your answer in standard form.

.....
(3)

(Total for Question 19 is 4 marks)

20 Solve the simultaneous equations

$$x^2 - 9y - x = 2y^2 - 12$$

$$x + 2y - 1 = 0$$

Show clear algebraic working.

(Total for Question 20 is 5 marks)

21 OAB is a triangle.

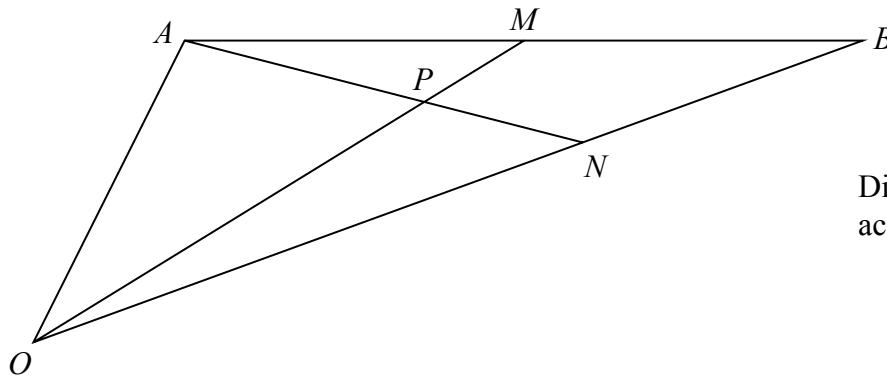


Diagram **NOT**
accurately drawn

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

M is the midpoint of AB .

N is the point on OB such that $ON : NB = 2 : 1$

P is the point on AN such that OPM is a straight line.

Use a vector method to find $OP : PM$

Show your working clearly.

.....
(Total for Question 21 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

BLANK PAGE