



Metric Academy

Excellence in Mathematics

GCSE – Mathematics, Paper 1 Mock Examination Paper – Set Y25

Candidate Surname:

Other Names:

Paper Code: MA/11

Time: 2 hours

Total Marks: 80

Paper Title: Paper 1

You must have:

- Mathematical Formulae

Information:

- There are [22] questions in this question paper.
- The total number of marks is **80**.
- The marks for **each question** are shown in brackets — use this as a guide to how much time to spend.

Advice:

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

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1. Write 620 in its prime factor form.

[3]

2. Solve $13 + 3x \leq 1$.

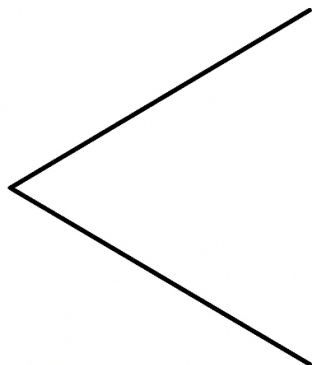
[2]

3. (i) Calculate $\frac{2}{3} \div 2\frac{1}{2}$. [3]

(ii) Calculate $2\frac{1}{4} - 1\frac{3}{5}$. [3]

4. Atlas is 5 years older than Ares.
Dion is three times as old as Ares.
The sum of their three ages is 80.
Find the ratio of Ares's age to Atlas's age to Dion's age. [3]

5. Construct the angle bisector of $\angle ABC$.



[2]

6. (a) Given that $v = 30$, $u = 6$, $t = 3$, find a .
Use the formula $v = u + at$.

[2]

- (b) Make t the subject, $v = u + at$.

[2]

7. After 20% discount a TV costs £640. What was TV's original price? [3]

8. Calculate:

(i) $\sqrt[3]{64}$

(ii) $(3^{-2})^{-2}$

(iii) $(0.9^2)^0$

(iv) $(\frac{25}{9})^{\frac{-1}{2}}$

[5]

9. (a) Complete the table of values for

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

x	-1	0	1	2	3	4
y						

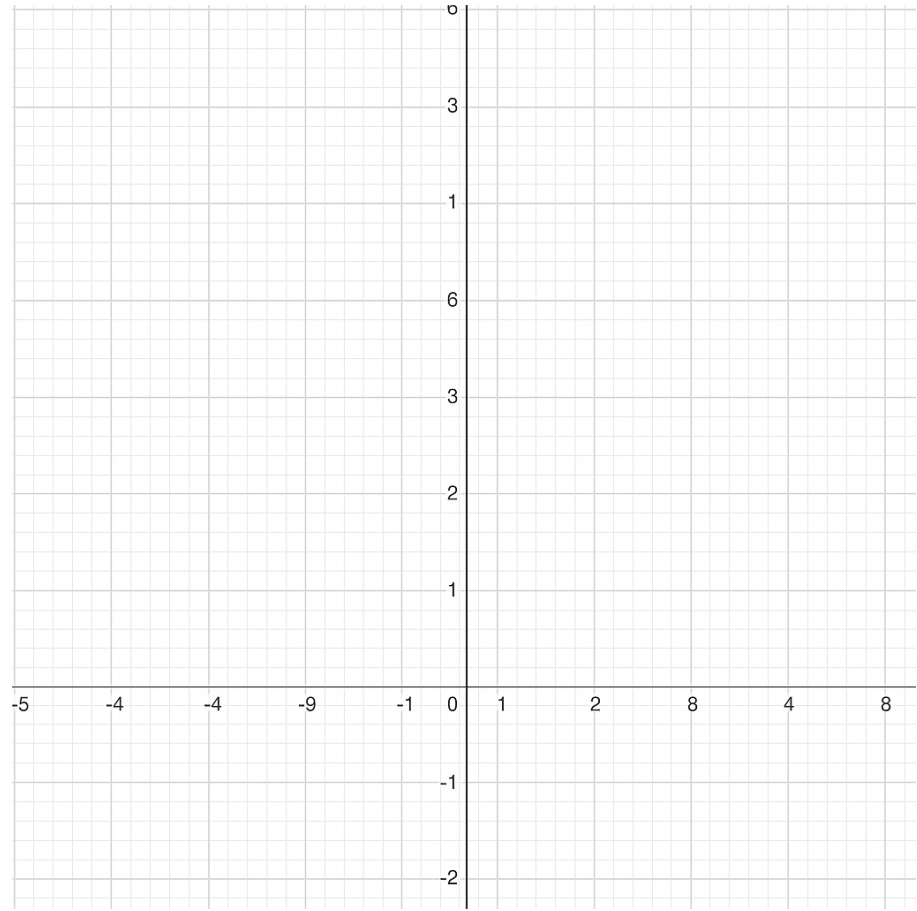
[2]

(b) On the grid below, draw the graph of

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

for values of x from -1 to 4 .

[2]



(c) Using your graph, find estimates for the solutions of the equation

$$x^2 - 2x - 3 = 0$$

[2]

10. A person is choosing an outfit with shirts, trousers, and pairs of shoes.

- There are 7 shirts
- There are x pairs of trousers
- There are 6 pairs of shoes

There are 378 different outfit combinations possible.

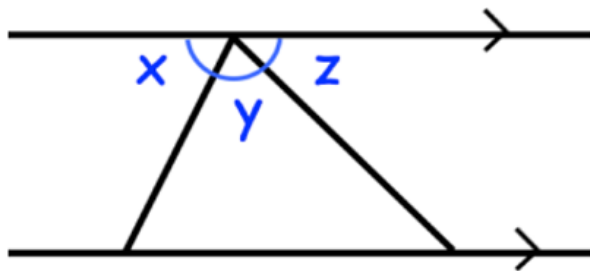
Work out the value of x .

[2]

11. Expand and simplify $(3x + 1)(x - 2)^2$

[3]

12. Rosa is proving that the angles in a triangle add up to 180° . She has started with this diagram. Complete her proof.



[3]

13. y is inversely proportional to p^2 . When $p = 5$, $y = 9$
 p is directly proportional to x^2 . When $x = 3$, $p = 15$
Find a formula for y in terms of x .
Give your answer in its simplest form.

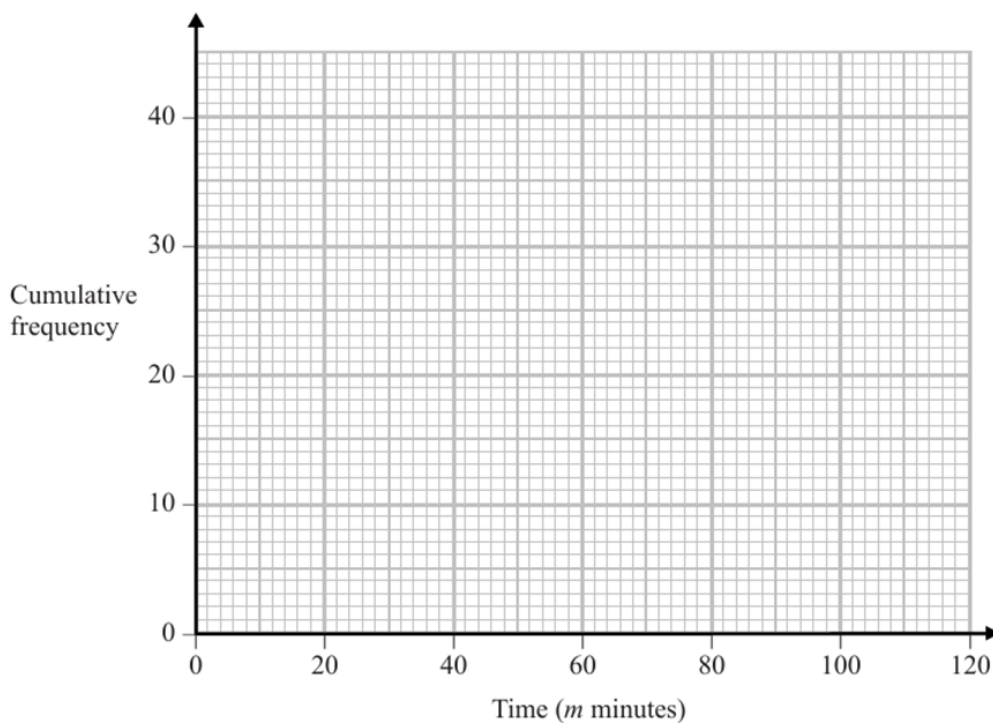
[4]

14. The cumulative frequency table shows information about the times, in minutes, taken by 40 people to complete a cycling challenge.

Time (m minutes)	Cumulative frequency
$20 < m \leq 40$	5
$20 < m \leq 60$	25
$20 < m \leq 80$	35
$20 < m \leq 100$	38
$20 < m \leq 120$	40

(a)

(a) On the grid below, draw a cumulative frequency graph for this information.



(2)

- (b) Use your graph to find an estimate for the interquartile range. [2]
- (c) One of the 40 people is chosen at random.
Use your graph to find an estimate for the probability that this person took between **50 minutes and 90 minutes** to complete the **cycling challenge**. [2]

15. Ellie wants to estimate the number of beads in a large jar.
She removes 40 beads, paints them red, and returns them to the jar.
After thoroughly mixing the beads, she randomly selects a sample of 20 beads.
In her sample, she finds 5 red beads.

Estimate the total number of beads in the jar. [2]

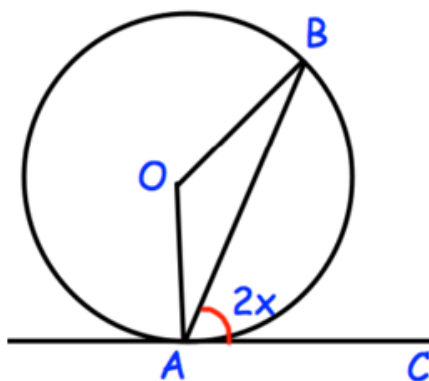
16. For all values of x :

$$f(x) = (x - 2)^2 \quad \text{and} \quad g(x) = 3(x + 1)$$

- (a) Show that $g(f(x)) = 3(x^2 - 4x + 4 + 1)$ [3]

- (b) Find $g^{-1}(12)$ [2]

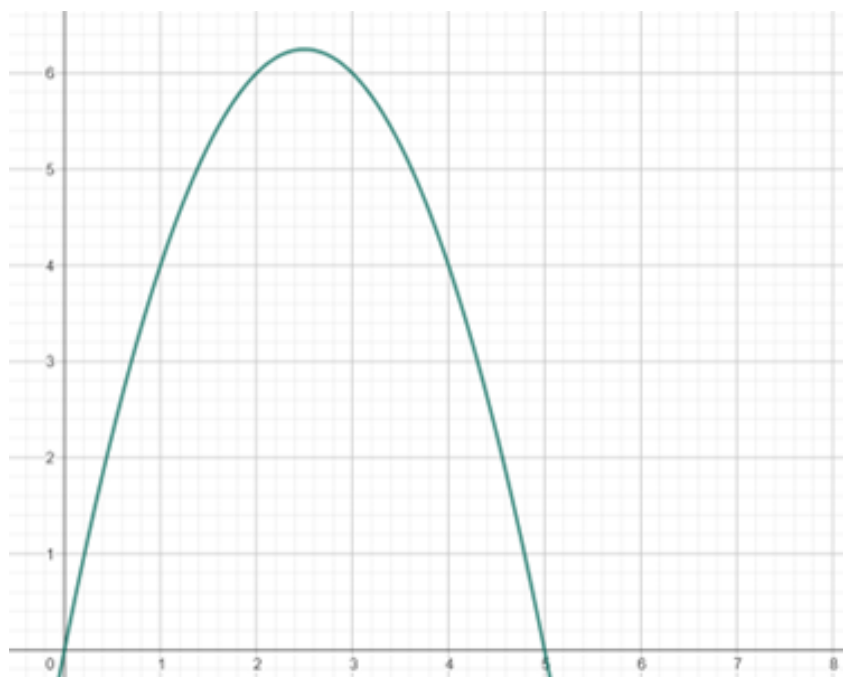
17. A and B are points on the circumference of a circle, centre O.
CA is a tangent to the circle.
Angle $CAB = 2x$



Prove that angle $AOB = 4x$
Give reasons for each stage of your working.

[3]

18. Here is a distance–time graph: where x axis is time in seconds, and y axis is distance in metres.



- (a) Work out an estimate of the gradient of the graph at $t = 4$. [2]
- (b) What does the gradient represent? [1]

19. Three solid shapes P , Q , and R are similar.

- The surface area of shape P is 9 cm^2
- The surface area of shape Q is 49 cm^2

The ratio of the volume of shape Q to the volume of shape R is $125 : 216$

Work out the ratio of the height of shape P to the height of shape R .

Give your answer in its simplest form.

[3]

20. A bag contains only red and blue counters.
The probability of choosing a blue counter at random is $\frac{2}{5}$.
After 3 red counters and 4 blue counters are added to the bag, the probability of choosing a blue counter becomes $\frac{5}{11}$.
Find the original number of red and blue counters.
Give your answer using positive integers. [4]

21. The 2nd term of a geometric sequence is

$$4 + 3\sqrt{3}$$

The 3rd term of the sequence is

$$19 + 12\sqrt{3}$$

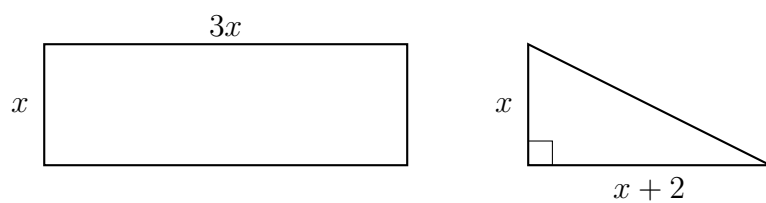
Find the value of the **common ratio** of the sequence.

Give your answer in the form $a + \sqrt{b}$, where a and b are integers.

You must show all your working.

[4]

22. Here is a rectangle and a right-angled triangle.



All measurements are in centimetres.

The area of the rectangle is greater than the area of the triangle.

Find the set of possible values of x .

[4]