



Name: _____ **Date:** _____ **Score:** _____ / 50

- 1** Write $x^2 + 10x + 7$ in the form $(x + a)^2 + b$, where a and b are integers. (2 marks)

Answer _____

- 2** The line with equation $y = 3x + 5$ is parallel to the line with equation $y = (2k - 1)x + 2$.
Work out the value of k . (2 marks)

Answer _____

- 3** 40 students took a typing test. Salma drew a cumulative frequency graph for their times. Salma plotted each cumulative frequency against the midpoint of its class interval.
- Explain the mistake Salma made.
 - Salma redraws the graph correctly. The correct graph shows a cumulative frequency of 34 at a time of 40 seconds. How many students took longer than 40 seconds?
 - What percentage of the 40 students took longer than 40 seconds?
- (3 marks)

Answer _____

- 4** Lena says, "The graph of $y = 3 \times 2^x$ goes through the point (2, 36), because $3 \times 2 = 6$ and $6^2 = 36$."
Lena is wrong. Explain her mistake and work out the correct y -value when $x = 2$. (2 marks)

Answer _____

- 5 Dev buys a van for £15 000.
The value of the van depreciates by 12% each year.
Calculate the value of the van at the end of 3 years.
Give your answer to the nearest penny.

(3 marks)

Answer _____

- 6 A sector of a circle has radius 9 cm and angle 120° .
Work out the arc length of the sector.
Give your answer in terms of π .

(2 marks)

Answer _____

- 7 A straight line passes through the points A (2, 5) and B (6, 17).
Work out the gradient of the line.

(2 marks)

Answer _____

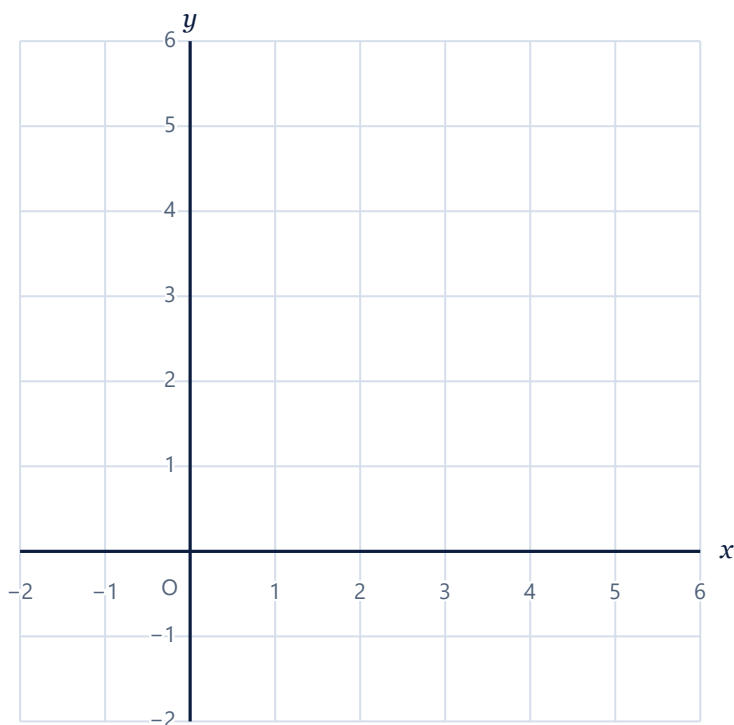
- 8 On the grid, shade the region that satisfies all three of these inequalities.

$$y \leq 3$$

$$y \geq x - 1$$

$$x > 0$$

Label the region R.



(3 marks)

Answer _____

- 9 y is inversely proportional to x .

When $x = 3$, $y = 20$.

Work out the value of y when $x = 5$.

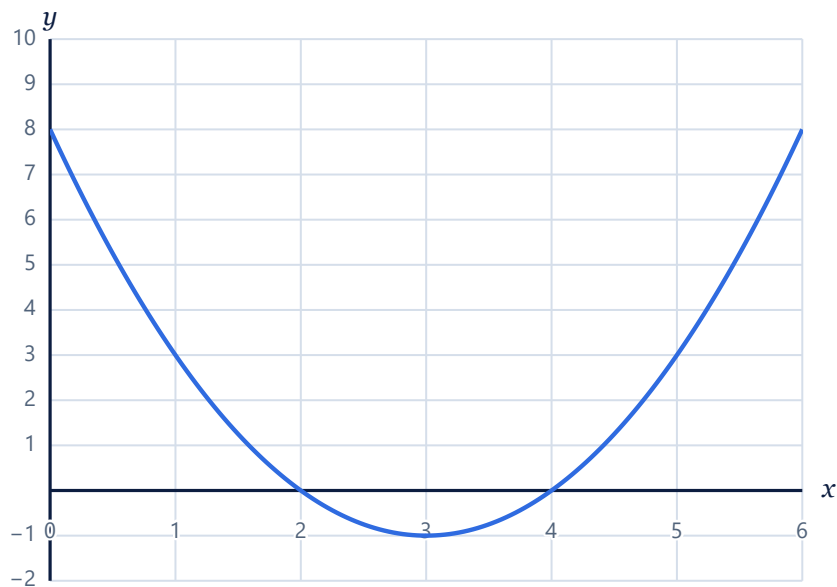
(2 marks)

Answer _____

10 The curve $y = x^2 - 6x + 8$ crosses the x -axis at $x = 2$ and at $x = 4$.

a. Write down the solutions of $x^2 - 6x + 8 = 0$

b. Write down the x -coordinate of the turning point of the curve.



(2 marks)

Answer _____

11 Without working out the squares, show that

$$53^2 - 47^2 = 600$$

(3 marks)

Answer _____

12 Solve $2x^2 + 5x - 12 = 0$

(3 marks)

Answer _____

- 13 The straight line L has equation $y = -\frac{x}{3} + 5$

Find the equation of the straight line that is perpendicular to L and passes through the point (2, -1).

(3 marks)

Answer _____

- 14 A box contains 12 chocolates: 5 dark and 7 milk. Ravi takes two chocolates at random without replacement.

Work out the probability that at least one of the chocolates is dark.

(3 marks)

Answer _____

- 15 A, B and C are points on a circle with centre O.

AOC is a diameter of the circle.

Angle CAB = 37° .

Work out the size of angle ACB. Give a reason for each stage of your working.

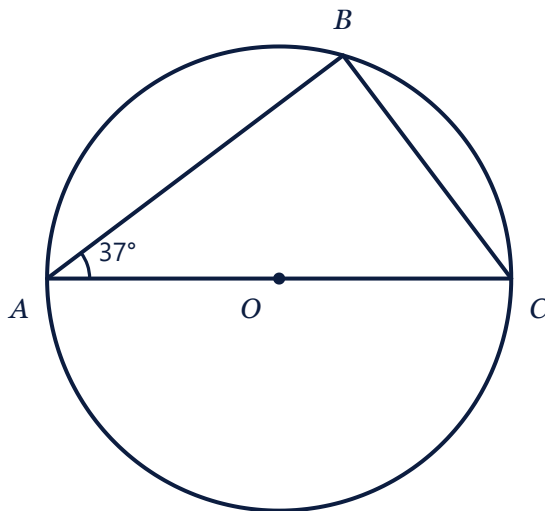


Diagram NOT accurately drawn

(3 marks)

Answer _____

16 Prove that $n^2 + n$ is even for every integer n .

(2 marks)

Answer _____

- 17 a. Using the discriminant, explain why the equation $x^2 + 3x + 7 = 0$ has no real solutions.
b. Write down the number of real solutions of the equation $x^2 - 6x + 9 = 0$. Give a reason for your answer.

(4 marks)

Answer _____

18 100 students were asked how they travel to school. The two-way table shows the results.

	Walk	Bus	Car	Total
Year 10	18	22	10	50
Year 11	12	14	24	50
Total	30	36	34	100

A student is chosen at random.

Given that the student travels by bus, work out the probability that they are in Year 11.

(2 marks)

Answer _____

19 $\mathbf{a} = (-2, 5)$ and $\mathbf{b} = (3, -1)$.

Work out $3\mathbf{a} - 2\mathbf{b}$ as a column vector.

(2 marks)

Answer _____

20 Triangle P has vertices at (2, 1), (4, 1) and (4, 2).

Triangle P is enlarged by scale factor -1 , centre (0, 0), to give triangle Q.

Write down the coordinates of the vertices of triangle Q.

(2 marks)

Answer _____

End of questions | Total 50 marks