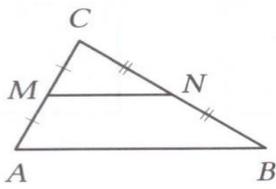
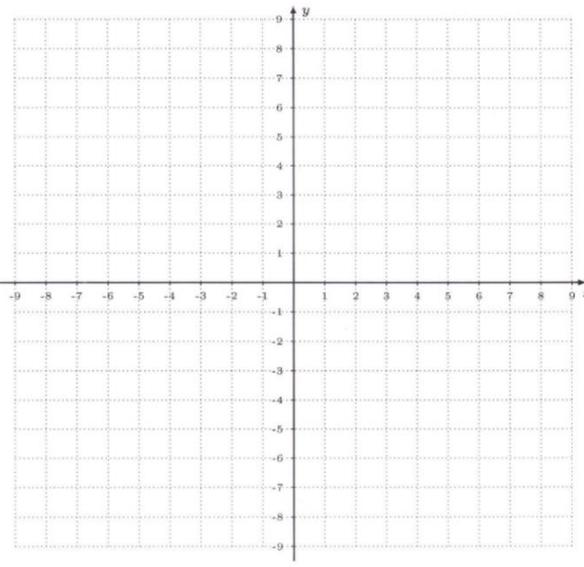


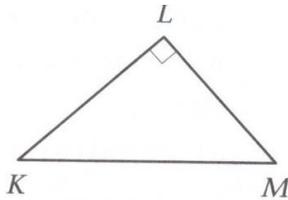
For questions 1-8 write down only the answer with no working.

<p>1. For pink paint, mix red paint and white paint in the ratio 1:4. How many cans of red paint do you need to mix with three cans of white paint?</p> <p>Answer:</p>	<p>(1 mark)</p>
<p>2. Solve the inequalities:</p> <p style="text-align: center;">a) $\frac{1}{x} \geq 0$; b) $(x+1)(x-2) < 0$.</p> <p>Answers: a)..... b).....</p>	<p>(2 marks)</p>
<p>3. Midsegment of the triangle ABC is MN (see the picture). $MN = 10\text{cm}$ and $\angle CAB = 35^\circ$. Find:</p> <p style="text-align: center;">(a) the length of AB; (b) the measure of the angle AMN.</p> <p>Answers: (a)..... (b).....</p>	 <p style="text-align: right; vertical-align: middle;">(2 marks)</p>
<p>4.</p> <p>(a) Sketch the graph of the function $f(x) = 6 - 2x$ on a coordinate plane. Show clearly the points of intersection of the graph and the axes.</p> <p>(b) A region R is bounded by the graph of $f(x) = 6 - 2x$, the x-axis and the y-axis. Shade the region R on a coordinate plane and find the area of this region.</p> <p>Answer: (b).....</p>	 <p style="text-align: right; vertical-align: middle;">(4 marks)</p>
<p>5. a) Calculate $\frac{5^{12} \cdot 25^{23}}{125^{20}}$. b) If $\sqrt{63} - \sqrt{7} = \sqrt{a}$, find the value of a.</p> <p>Answers: a)..... b).....</p>	<p>(2 marks)</p>
<p>6. A fair coin is tossed three times. Find the probability of observing:</p> <p style="text-align: center;">(a) three tails; (b) at least two tails.</p> <p>Answers: (a)..... (b).....</p>	<p>(2 marks)</p>

7. KLM is the right triangle ($\angle KLM = 90^\circ$).
 $KM = 13\text{cm}$ and $KL = 12\text{cm}$ (**diagram not to scale**). Find:

(a) length of LM ; (b) $\sin LMK$; (c) $\tan LKM$.

Answers: (a)..... (b)..... (c)

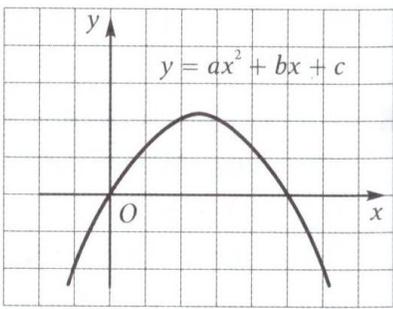


(3 marks)

8. In the diagram, parabola $y = ax^2 + bx + c$ is given, which passes through the origin. Are values of the coefficients and the expression below **positive, negative** or **equal to zero**?

(a) a ; (b) c ; (c) $b^2 - 4ac$; (d) b .

Answers: (a)..... (b).....
(c) (d).....



(4 marks)

For questions 9-18 provide the working. Write on the squared sheet.

9. A tetrahedral (four-sided) die has written on it the numbers 1, 2, 3 and 4. The die is rolled many times and the scores are noted. The table below shows the resulting frequency distribution.

Score	1	2	3	4
Frequency	18	x	y	22

The die was rolled a total of 100 times.

(a) Write down an equation, in terms of x and y , for the total number of times the die was rolled. (1 mark)

The mean score is 2.71.

(b) Using the mean score, write down a second equation in terms of x and y . (2 marks)

(c) Find the value of x and of y . (3 marks)

10. In the following diagram, O is the centre of the circle and AT is the tangent to the circle.

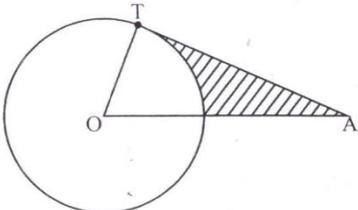


diagram not to scale

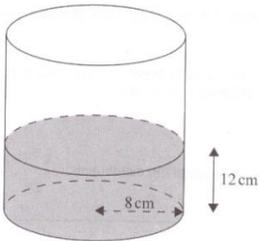
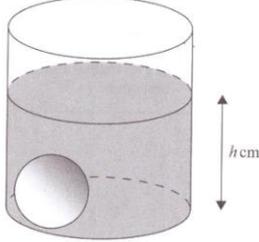
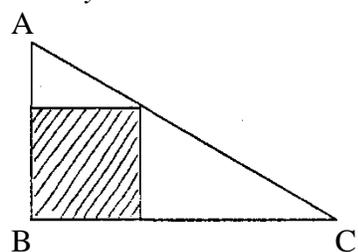
If $OA = 12\text{cm}$, and the circle has a radius of 6cm , find:

(a) the length of AT (give your answer as exact value); (2 marks)

(b) the measure of the angle TOA ; (2 marks)

(c) the area of the shaded region to 2 decimal places. (3 marks)

11. What is the percentage in increase of the product of two numbers, a and b , if number a is increased by 20%, and number b is decreased by 10%? (3 marks)

<p>12. Prove that with any possible value of α the value of the expression $\cos^2 \alpha \cdot (1 + \tan^2 \alpha)$ is constant.</p>	<p>(2 marks)</p>
<p>13. Express as a product of linear factors:</p> <p>a) $1 - 9x^2$;</p> <p>b) $x^3 - 7x + 6$.</p>	<p>(1 mark) (3 marks)</p>
<p>14. a) Given $3^m = 2$. Find the value of 27^{m+1}.</p> <p>b) Prove that the number $6^{2017} - 6^{2015}$ is divisible by 70.</p>	<p>(2 marks) (2 marks)</p>
<p>15. A cylindrical container with a radius of 8 cm is placed on a flat surface. The container is filled with water to a height of 12 cm, as shown in the diagram (diagram not to scale).</p> <p>(a) Find the volume of water in the container (in terms of π).</p> <p>A heavy ball with a radius of 3 cm is dropped into the container. As a result, the height of water increases to h cm, as shown in the following diagram (diagram not to scale).</p> <p>(b) Find the value of h.</p> <p>You can use formulae: Volume of a cylinder: $V = \pi r^2 h$, where r is the radius, h is the height. Volume of a sphere: $V = \frac{4}{3} \pi r^3$, where r is the radius.</p>	<div style="display: flex; flex-direction: column; align-items: center;">   </div> <p>(1 mark) (3 marks)</p>
<p>16. A group of 5 boys and 3 girls are to be photographed together. Find the number of different possible arrangements, if:</p> <p>a) boys and girls are to sit on 8 chairs placed in a row;</p> <p>b) the girls are to sit on 3 chairs placed in a row and the boys are to stand in a line behind them.</p>	<p>(1 mark) (2 marks)</p>
<p>17. If $x < y$, simplify $\frac{2 x - y - y - x }{x^2 + y^2 - 2xy}$.</p>	<p>(3 marks)</p>
<p>18. The square is inscribed in the right triangle ABC (see the picture below). The sides of the right angle of the triangle are $AB = x$ and $BC = y$. Express the length a of the side of the square in terms of x and y.</p> 	<p>(4 marks)</p>