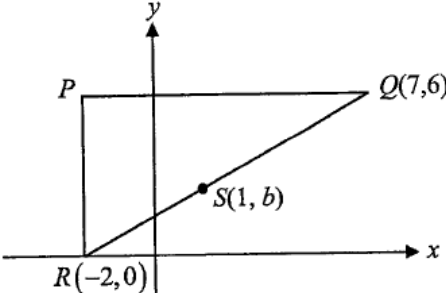
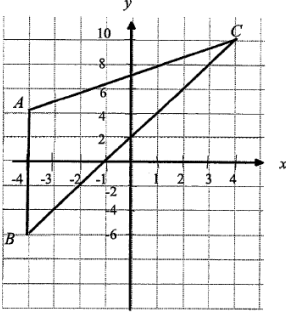
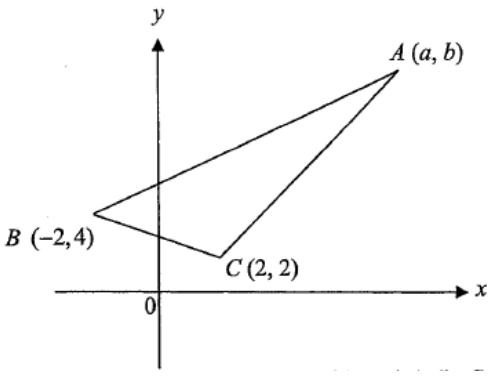


8 MUST KNOW QUESTIONS TO CONQUER COORDINATE GEOMETRY

1	<p>A line l is represented by the equation $3x - 4y = 18$. It crosses the x-axis at the point A and the y-axis at the point B.</p> <p>(a) Find the coordinates of A and B.</p> <p>(b) Calculate the length of the line joining A and B.</p> <p>Ans: (a) $A(6, 0)$ $B(0, -4.5)$ (b) 7.5</p>
2	<div style="text-align: center;">  </div> <p>In the diagram above, Q is the point $(7, 6)$ and R is the point $(-2, 0)$. PQ is parallel to the x-axis and PR is parallel to the y-axis.</p> <p>(a) Write down the coordinates of P.</p> <p>(b) If $S(1, b)$ is a point on QR, find the value of b.</p> <p>Ans: (a) $P = (-2, 6)$ (b) $b = 2$</p>
3	<p>The diagram shows a triangle with vertices $A(-4, 4)$, $B(-4, -6)$ and $C(4, 10)$.</p> <div style="text-align: center;">  </div> <p>(a) Find the length of line BC.</p> <p>(b) Find the coordinates of the point D such that $ACDB$ is a parallelogram.</p> <p>(c) Find the area of triangle ABC.</p> <p>(d) Find the perpendicular distance from A to BC.</p> <p>Ans: (a) $\sqrt{(-4 - 4)^2 + (-6 - 10)^2} = 17.8885 = 17.9$ units (3 sig fig) (b) $D(4, 0)$ (c) $\frac{1}{2} \times 8 \times 10 = 40$ square units (d) 4.47</p>

4	<p>A is the point $(5, 11)$ and B is the point $(-4, -2)$ respectively.</p> <p>(a) Find the length of the line AB.</p> <p>(b) Find the equation of the line AB.</p> <p>(c) The equation of line p is $9y = 13x + 9$.</p> <p>(i) Show how you can tell that the line p does not intersect the line AB.</p> <p>(ii) Another line q is $3y - 5x = 6$.</p> <p style="padding-left: 20px;">Find the coordinates of the point of intersection of the line p and the line q.</p> <p>Ans: (a) 15.8 unit (b) $9y = 13x + 34$</p> <p>(a) (i) line p: $9y = 13x + 9$ (Given). Hence, $y = \frac{13}{9}x + 1$</p> <p>(ii) $x = -4.5$ or $y = -5.5$</p>
5	<p>The figure shows a triangle ABC with $B(-2, 4)$, $C(2, 2)$ and $A(a, b)$. The gradients of BC, AC and AB are $-2n$, $2n$, n respectively.</p> <p>(a) Find</p> <p>(i) the value of n,</p> <p>(ii) the coordinates of A,</p> <p>(iii) the length of BC.</p> <p>(b) Given that the area of triangle ABC is 12 units², find the length of the perpendicular line drawn from A to BC.</p> <div style="text-align: right; margin-top: 10px;">  </div> <p>Ans: (a)(i) $n = \frac{1}{4}$ (ii) $A(14, 8)$ (iii) Length of $BC = 4.47$units (b) $h = 5.37$units</p>

Paper 2

- 1 A consultant was studying the effect of the introduction of a new policy to a company's business profit. He felt that the amount of profit, y hundred thousand dollars, over a period of x months could be modelled by the equation

$$y = \frac{x^3}{5} + \frac{10}{x} - 10.$$

Some corresponding values of x and y are given in the following table.

x	0.5	1.5	2	3	4	4.5	5
y	10.03	-2.66	-3.4	-1.27	5.30	10.45	17.00

- (a) Using a scale of 2 cm to represent 1 unit, draw a horizontal x -axis for $0 \leq x \leq 5$. Using a scale of 1 cm to represent 1 unit, draw a vertical y -axis for $-4 \leq y \leq 18$. On your axes, plot the points given in the table and join them with a smooth curve.
- (b) Use your graph to state the period when the company is suffering a loss.
- (c) Use your graph to find the solution(s) to the equation $\frac{x^3}{5} + \frac{10}{x} = 15$ in the range $0 \leq x \leq 5$.
- (d) By drawing a tangent, find the gradient of the curve at $(1.5, -2.66)$.
- (e) (i) On the same axes, draw the line $y = 3x + 1$ for $0 \leq x \leq 5$.
 (ii) The x -coordinates of the points where the line in (e)(i) intersects the curve are the solutions of the equation $x^4 - ax^2 - bx + 50 = 0$. Find the value of a and of b .

Ans: (b) $0.75\text{months} < t < 3.25\text{months}(\pm 0.5)$ (c) $x = 0.45$ or 4 ± 0.5

(d) $m = -2 (\pm 0.5)$ (e)(i) (ii) $a = 15, b = 55$

- 2 The variables x and y are connected by the equation $y = \frac{x^3}{30} + \frac{20}{x} - 10$. Some corresponding values of x and y , correct to 2 decimal places, are given in the table below.

x	1	2	3	4	5	6	7
y	p	0.27	-2.43	-2.87	-1.83	0.53	4.29

- (a) Calculate the value of p .
- (b) Using a scale of 2 cm to represent 1 unit, draw a horizontal x -axis for $0 \leq x \leq 7$. Using a scale of 1 cm to represent 1 unit, draw a vertical y -axis for $-3 \leq y \leq 11$. On your axes, plot the points given in the table and join them with a smooth curve.
- (c) By drawing a line, use your graph to find the solution to the equation $\frac{x^3}{30} + \frac{20}{x} = 15$.
- (d) By drawing a tangent, find the gradient of the curve at $x = 2$.
- (e) (i) On the same axes, draw the line $y + 2x = 10$.
 (ii) Write down the x -coordinates of the points where the line intersects the curve.

Ans: (a) $p = 10.03$ (2 dec. pls) or 10.0 (3 sig. figs) or $10\frac{1}{30}$

(b) Accurately plotted coordinates (at least 3 pairs) ... see graph.....

Correct scales & ranges for x and y axes + label of curve & axes

Smoothness of curve $x = 1.30 \pm 0.2, -4.60$, (i) Draw the line $y + 2x = 10$

Intersection points are: $x = 1.15 \pm 0.2$ and $x = 5.45 \pm 0.2$

3

 The table below shows some values of x and y , where $y = -x^2 + 4x + 1$.

x	-1	0	1	2	3	4	5
y	k	1	4	n	4	1	-4

- (a) Find the value of k and of n .
- (b) Using a scale of 2 cm to 1 unit on the x -axis and 2 cm to 1 unit on the y -axis, draw the graph of $y = -x^2 + 4x + 1$ for $-1 \leq x \leq 5$.
- (c) Use your graph to estimate the solutions of the equation $-x^2 + 4x + 1 = 0$.
- (d) By drawing a suitable straight line on the graph, solve the equation $-x^2 + 4x + 1 = 3 - x$.
- (e) By drawing a tangent, find the gradient of the curve $y = -x^2 + 4x + 1$ at the point where $x = 1$.

Ans: (a) $x = -1, k = -4, x = 2, n = 5$ (c) From graph, $x =$ answer rounded to 2 dp or less (read from individual graph, accept -0.336 to $-0.136, 4.16$ to 4.36)

(d) Draw the line $y = 3 - x$

From graph, $x =$ answer rounded to 2 dp or less (read from individual graph, accept 0.338 to $0.538, 4.46$ to 4.66)

(e) Tangent drawn at $x = 1$ with coordinates seen or triangle drawn.

Gradient = 2 (read from individual graph, accept 1.5 to 2.4)