

Strand 2 Chapter 1 Coordinate Geometry - The Line

1. I know how to find the **distance between 2 points** (x_1, y_1) and (x_2, y_2) using formulae.
2. I know how to find the **midpoint M of a line segment** (x, y) using formulae.
3. I know that the **slope m of a line** is found by dividing the vertical change (rise) by the horizontal change (run).
4. I know that **slope of a line** tells us how **much y changes for a 1 unit change in x** (reading from left to right) and that slopes can be +ve, -ve or equal to zero.
5. I know that **parallel lines have equal slopes**.
6. I know that if **2 lines are perpendicular then the product of their slopes is equal to -1**.
7. I know that I can find the **slope of a line perpendicular to another** line of known slope by **finding the reciprocal of the known slope value and changing its sign**.

See Example 1 Page 9.

Ex 1.1 Q1 – Q15 Odd Page 9

8. I can find the **area of a triangle with vertices $(0,0)$, (x_1, y_1) and (x_2, y_2)** using formulae ensuring to use the **|abs| positive value of the answer**.
9. I can find the **area of a triangle with vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3)** by finding the image of the triangle under translation so that one of the vertices is at **$(0,0)$** and then finding the area of that triangle using formulae.

See Example 1 and Example 2 Page 11

10. I know how to find the area of a quadrilateral by first dividing it into 2 triangles and solving as above.

Ex 1.2 Q2 – Q12 Even Page 12

11. I know that the **general form of the equation of the line is $ax + bx + c = 0$** and that this is the preferred presentation of an equation of a line in an answer.
12. I know how to **find the equation of a line** given its **slope m** and one point **(x_1, y_1)** using **$y - y_1 = m(x - x_1)$**

I know to take care when the slope is a –ve fraction

I know that the slope can be found from the equation **$m = -(a/b)$**

13. I know that the equation of a line can be expressed in the slope-intercept form

$$y = mx + c$$

where m (the coefficient of x) is the slope of the line and c is the y-intercept value

14. I can **rewrite equations of the line from general form $ax + bx + c = 0$ to to slope-intercept form $y = mx + c$**

Example 1 Page 13

15. I know that the slope of a line is defined as the tangent of the angle which the line makes with the **positive direction** of the x-axis

1. If the angle is less than 90° , the slope is positive.
2. If the angle is between 90° and 180° , the slope is negative
3. $\tan 45^\circ = 1$; $\tan 135^\circ = -1$

16. I know that the equation of any line through a given point say (3,4) is $y - 4 = m(x - 3)$
i.e **$mx - y - 3m + 4 = 0$**

See Example 3 Page 15

17. I know that the equation of any line **parallel to $ax + by + c = 0$ is $ax + by + k = 0$**

18. I know that the equation of any line **perpendicular to $ax + by + c = 0$ is $bx - ay + k = 0$**

Example 2 Page 14 (uses $m = -(a/b)$)

19. I know to use the intercept method to find the point where a **line cuts the x axis by letting $y=0$**

20. I know to use the intercept method to find the point where a **line cuts the y axis by letting $x=0$**

21. I know how to verify if a point is on a line by substituting the x and y values into the equation to see if it satisfies the equation.

Ex 1.3 Q2 - Q20 Even Page 16

22. I can find the coordinates of a point which divides a line internally and externally in a given ratio using formulae.

Example 1 Page 17

Ex 1.4 Q2 – Q10 Even Page 18

23. I know that the **median line** is a **line which joins the vertex of a triangle to the midpoint of the opposite side.**

24. I know that the **medians of a triangle intersect at the Centroid** of a triangle.

25. I know that the **medians** of a triangle **divide each other in the ratio 2:1**

26. I know how to find the **Centroid** of a Triangle given the 3 vertices **$A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$** using formulae.

27. I know that the **perpendicular bisectors** of the sides of a triangle are also known as **mediators** and that the **circumcentre is at the intersection** of these.

28. I know that the line segment drawn from the vertex of a triangle to the circumcentre is the **radius of the circumcircle**.
29. I know that the **orthocentre** is the **point of intersection of the perpendiculars from the vertices to the opposite sides**.
30. I can find the orthocentre by solving the equations of the 2 perpendiculars simultaneously.

Example 1 Page 20

Ex 1.5 Q1 to Q7 Odd Page 20

31. I can find the **perpendicular distance from a point to a line using formulae**.
32. I know that I can **find the distance between 2 parallel lines** by letting $x = 0$ and substituting this into one line to find a point on that line (i.e. where it cuts the y axis) and then using formulae to find the distance between that point and the other line.

Example 1 Page 21

33. I know that **perpendiculars (distances) to a line from points** on the **same side** of the line have the **same sign** and that perpendiculars (distances) to a line from points on opposite sides of the line have **different signs**.

Examples 2 and 3 Page 22

Ex 1.6 Q1 – Q17 Odd Page 23

34. I know how to find the size of the acute angle θ between 2 lines using

$$\tan \theta = \frac{m_1 - m_2}{1 + m_1 m_2}$$

I can then find the obtuse angle by finding $180^\circ - \theta$

35. I know how to find the equations of 2 lines through a given point which make angles with a given line l

Example 2 Page 25

Ex 1.7 Q2 – Q12 Even Page 26

36. I can derive equations illustrating the relationship between two variables from a plot of the given information and can extrapolate data from the plot/equation.

Example 1 Page 27

Ex 1.8 Q1 – Q6 Even Page 28