

CO-ORDINATE GEOMETRY

Linear Equations

1. Express the following equations in the form $y = mx + b$.
 - (a) $4y - 12x = 8$
 - (b) $3x - y = 8$
 - (c) $12x - 2y + 6 = 0$
 - (d) $\frac{4x + 4y}{6} = 2$
 - (e) $4x = 3y - 8$
 - (f) $\frac{2x - 5y}{3} = 1$
2. Find the x and y intercepts of the following linear functions and sketch its graph.
 - (a) $y = 4x - 6$
 - (b) $y = \frac{2x}{3} + 4$
 - (c) $3x + 2y = 6$
3. The following equations are in the general form $Ax + By + C = 0$. Express each of them in the form $y = mx + b$ and state the gradient and y intercept of its graph.
 - (a) $3x - y + 5 = 0$
 - (b) $x + 3y - 4 = 0$
 - (c) $4x + y - 3 = 0$
4. Find the slope of the line joining:
 - (a) $(1, 1)$ and $(3, 2)$
 - (b) $(1, 1)$ and $(-1, 2)$
 - (c) $(1, 1)$ and $(1, 0)$
5. Find the equation of the straight line which:
 - (a) passes through $(1, 1)$ with slope 2
 - (b) passes through origin with slope -2
 - (c) passes through $(1, 1)$ with slope 0
 - (d) passes through $(1, 1)$ and $(3, 2)$
 - (e) has a slope of 2 and a y intercept of 3
 - (f) has a x intercept of -3 and a y intercept of 3
6. Show that the straight line $3x - 2y + 4 = 0$ passes through the points $(-2, -1)$ and $(4, 8)$
7. The vertices of a triangle are the points $A(-2, 4)$, $B(5, -3)$ and $C(1, 9)$. Find the slope of each side.
8. A and B are the points $(1, 4)$ and $(3, 2)$ while X and Y are the points $(4, 6)$ and $(2, 8)$. Prove that AB is parallel to XY by showing that the gradient of AB is equal to the gradient of XY .
9. Find the equation of the line which is parallel to the y axis and midway between the lines $x = -2$ and $x = 4$.
10. Find the equation of the line which is equidistant from the lines $y = 1$ and $y = -3$.
11. Find the equation of the line which passes through the points.
 - (a) $(3, 1)$ and $(7, 4)$
 - (b) $(3, -2)$ and $(-1, 4)$
 - (c) $(-4, 0)$ and $(0, 5)$
12. Find the equation of the straight line through $(1, 2)$, $(-1, 3)$.
What is its gradient.
What are its intercepts on the axes.

13. What would be the gradient of a line parallel to the straight line $3x - y + 4 = 0$?
14. What would be the gradient of a line perpendicular to the straight line $5x - 2y - 1 = 0$?
15. State whether the following pairs of lines whose equations are given are parallel, perpendicular or neither.
- (a) $2x - y + 4 = 0$ and $6x - 3y + 7 = 0$
 - (b) $x + 3y - 2 = 0$ and $3x - y + 4 = 0$
 - (c) $5x - 2y + 3 = 0$ and $3x + 5y - 2 = 0$
16. Find the equation of the straight lines:
- (a) passing through the point $(3, -2)$ and parallel to the line $4x - y + 6 = 0$
 - (b) passing through the point $(2, 6)$ and perpendicular to the line $2x - 3y + 1 = 0$
 - (c) passing through the origin and parallel to the line $5x + 3y - 7 = 0$
17. (a) What is the equation of the line through $(2, 3)$ parallel to the line $3x - 7y + 2 = 0$?
- (b) What is the equation of the line through $(1, -4)$ perpendicular to the line $4x + y + 9 = 0$?
- (c) Prove that the line joining $(1, 2)$ and $(-5, 6)$, is perpendicular to the line joining $(-2, 3)$ and $(2, 9)$?
18. Find the point of intersection of the following pairs of lines whose equations are given.
- (a) $4x - y - 1 = 0$ and $2x + y - 5 = 0$
 - (b) $x + 3y = 9$ and $5x - 2y = 11$
19. Find the equation of the straight line which passes through the origin and through the point of intersection of the lines $4x - y - 3 = 0$ and $x + 2y - 12 = 0$.
20. Find the equation of the straight line which passes through the point of intersection of $5x - y - 3 = 0$ and $2x - y = 0$ and which is
- (a) parallel to the straight line $4x + 3y - 2 = 0$
 - (b) perpendicular to the straight line $4x + 3y - 2 = 0$
21. Find the distance between the following pairs of points.
- (a) $(3, 5)$ and $(6, 9)$
 - (b) $(3, 8)$ and $(-5, -7)$
 - (c) $(0, -1)$ and $(-2, 1)$
22. Show that the triangle with vertices $A(1, 1)$, $B(4, 5)$ and $C(0, 2)$ is isosceles.
23. Prove that a right triangle is formed if the points $P(1, 6)$, $Q(-6, 10)$ and $R(-3, 4)$ are joined.
24. What is the mid-point of the interval joining $(4, 5)$ and $(-2, 11)$?
25. Find the coordinates of the mid-point of the interval joining the points $(1, 3)$ and $(3, -1)$.

ANSWERS - Co-ord. Geom

1. (a) $y = 3x + 2$

(b) $y = 3x - 8$

(c) $y = 6x + 3$

(d) $y = -x + 3$

(e) $y = \frac{4}{3}x + \frac{8}{3}$

(f) $y = \frac{2}{5}x - \frac{3}{5}$

2. (a) x intercept $\frac{3}{2}$
y intercept -6

(b) x intercept -6
y intercept 4

(c) x intercept 2
y intercept 3

3. (a) $y = 3x + 5; m = 3, b = 5$ (b) $y = -\frac{1}{3}x + \frac{4}{3}; m = -\frac{1}{3}, b = \frac{4}{3}$

(c) $y = -4x + 3; m = -4, b = 3$

4. (a) $\frac{1}{2}$

(b) $-\frac{1}{2}$

(c) infinite

5. (a) $y = 2x - 1$

(b) $y = -2x$

(c) $y = 1$

(d) $y = \frac{1}{2}x + \frac{1}{2}$

(e) $y = 2x + 3$

(f) $\frac{x}{-3} + \frac{y}{3} = 1$

7. $AB: m = -1; BC: m = -3; AC: m = \frac{5}{3}$

9. $\frac{1}{x} = 1$

10. $y = -1$

11. (a) $y = \frac{3}{4}x - \frac{5}{4}$

(b) $y = -\frac{3}{2}x + \frac{5}{3}$

(c) $y = \frac{5}{4}x + 5$

12. $y = -\frac{x}{2} + \frac{5}{2}, -\frac{1}{2}, 5, \frac{5}{2}$

13. $m = 3$

14. $m = \frac{2}{5}$

15. (a) parallel

(b) perpendicular

(c) neither

16. (a) $y = 4x - 14$

(b) $y = -\frac{3}{2}x + 9$

(c) $y = -\frac{5}{3}x$

17. (a) $y = \frac{3}{7}x + \frac{15}{7}$

(b) $y = -\frac{x}{4} - \frac{15}{4}$

18. (a) (1,3)

(b) (3,2)

19. $2y = 5x$

20. (a) $y = -\frac{4}{3}x + \frac{10}{3}$

(b) $y = \frac{3}{4}x + \frac{5}{4}$

21. (a) 5

(b) 17

(c) $2\sqrt{2}$

(1,8) ~~24~~

25, (2,1)