



Attempt all questions before checking the answer key. Give exact answers unless an approximation is requested. Draw a sketch where it clarifies geometry.

A. Very short answers - 1 mark each

1. Find the slope of the line joining (2, -1) and (5, 8).
2. What is the slope of a line parallel to the x-axis?
3. Write the equation of the vertical line through (-3, 4).
4. State the condition for two non-vertical lines to be perpendicular.
5. Find the x-intercept of $2x + 3y = 12$.

B. Short answers / practice - 2 marks each

6. Find the line through (2, 3) with slope -2.
7. Find the line through (-1, 2) and (3, 10).
8. Find the line with intercepts 4 and -3 on the x- and y-axes.
9. Find the angle between lines of slopes 1 and $\sqrt{3}$.
10. Find the perpendicular distance of (2, -3) from $3x - 4y + 5 = 0$.
11. Find slope of $3x + 2y = 7$.
12. Find line through origin parallel to $y = 4x + 2$.
13. Find intercepts of $x/3 + y/5 = 1$.
14. Find distance of (0,0) from $3x + 4y = 10$.
15. Are $x + y = 2$ and $2x + 2y = 7$ parallel?
16. Find line through (2, -1) parallel to y-axis.
17. Find line through (0,3) and (3,0).
18. Find angle made by slope -1 with positive x-axis, in $[0, \pi)$.
19. Find k so $y = kx + 1$ is perpendicular to $y = 2x - 3$.
20. Find distance between $y = 2$ and $y = -3$.

C. Short answers - 3 marks each

21. Find the line through (1, 2) parallel to $3x - 2y = 7$ and the line through that point perpendicular to it.
22. Find the perpendicular bisector of the segment joining (2, 1) and (6, 5).

23. Find the lines through (1, 1) making an angle of 45° with $x + y = 0$.

24. Find the distance between parallel lines $3x - 4y + 7 = 0$ and $3x - 4y - 8 = 0$.

25. Find a line through (3, 2) that cuts off equal positive intercepts from the coordinate axes.

D. Long answers - 5 marks each

26. A triangle has vertices A(1, 1), B(5, 1), C(3, 5). Find equations of its three medians and their common intersection point.

27. Find the foot of the perpendicular from (4, 3) to $x + y = 1$ and hence the reflection of the point in that line.

28. Find equations of the lines passing through the intersection of $2x + y = 5$ and $x - y = 1$, one parallel and one perpendicular to $3x + 4y = 7$. Find their intercepts where they exist.

29. A line through (2, 3) cuts positive intercepts a and b with $a + b = 12$. Find all possible equations and the corresponding areas of the triangles formed with the axes.

30. For triangle A(0, 0), B(6, 0), C(2, 4), find the altitude from C, median from A and their intersection. Explain why this point is not generally the orthocentre or centroid.

ANSWER KEY - Numerical / short answers

- 1) 3. 2) 0. 3) $x = -3$. 4) $m_1 m_2 = -1$. 5) 6. 6) $y = -2x + 7$. 7) $y = 2x + 4$. 8) $3x - 4y = 12$. 9) 15° . 10) $23/5$. 11) $-3/2$. 12) $y = 4x$. 13) 3 and 5. 14) 2. 15) Yes; distinct proportional normal vectors. 16) $x = 2$. 17) $x + y = 3$. 18) $3\pi/4$. 19) $-1/2$. 20) 5. 21) $3x - 2y + 1 = 0$; $2x + 3y - 8 = 0$. 22) $x + y = 7$. 23) $x = 1$ and $y = 1$. 24) 3. 25) $x + y = 5$. 26) $x = 3$; $3x - y - 2 = 0$; $3x + y - 16 = 0$; centroid (3, 7/3). 27) Foot (1, 0); reflection (-2, -3). 28) $3x + 4y = 10$, intercepts $10/3, 5/2$; $4x - 3y = 5$, intercepts $5/4, -5/3$. 29) (a, b) = (8, 4) or (3, 9); lines $x/8 + y/4 = 1$ and $x/3 + y/9 = 1$; areas 16 and $27/2$. 30) Altitude $x = 2$; median $y = x/2$; intersection (2, 1).