PERPENDICULAR LINES

Answer all of these questions. Remember to show your working out in all questions.

MAIN QUESTIONS

1. Find the gradient of a line perpendicular to y = 2x + 3 | -1/2

2. Find the gradient of a line perpendicular to y = -4x + 7 | 1/4

3. Find the equation of the line perpendicular to y = 3x - 1 passing through (0, 0) | y = -1/3x

4. Find the equation of the line perpendicular to y = -2x + 5 passing through (1, 1) | y = 1/2x + 1/2

5. Find the equation of the line perpendicular to y = 1/2x - 4 passing through (2, -3) | y = -2x + 1

6. Find the equation of the line perpendicular to y = -3/4x + 2 passing through (-1, 2) | y = 4/3x + 10/3

7. Find the equation of the line perpendicular to 2x + 3y = 6 passing through (4, -1) | y = 3/2x - 7

8. Find the equation of the line perpendicular to 5x - y = 10 passing through (0, 3) | y = -1/5x + 3

9. Find the equation of the line perpendicular to x + 4y = 8 passing through (2, 5)

$y = 4x - 3$

10. Find the equation of the line perpendicular to 3x - 2y = 12 passing through (-2, 1)

$y = -2/3x - 1/3$

11. Find the equation of the line perpendicular to y = 5 passing through (3, 7)

$x = 3$

12. Find the equation of the line perpendicular to x = -2 passing through (4, -1)

$y = -1$

13. Find the equation of the line perpendicular to y = -3x + 2 passing through the origin

$y = 1/3x$

14. Find the equation of the line perpendicular to y = 1/4x + 3 passing through (8, 0)

$y = -4x + 32$

15. Find the equation of the line perpendicular to 4x + y = 9 passing through (1, 1)

$y = 1/4x + 3/4$

16. Find the equation of the line perpendicular to 2x - 5y = 10 passing through (5, -2)

$y = -5/2x + 21/2$

17. Find the equation of the line perpendicular to y = 0 passing through (3, 4)

$x = 3$

18. Find the equation of the line perpendicular to x = 5 passing through (-1, -1)

$y = -1$

19. Find the equation of the line perpendicular to y = 2/3x - 4 passing through (6, 1)

$y = -3/2x + 10$

20. Find the equation of the line perpendicular to y = -5x + 1 passing through (-2, -3)

$y = 1/5x - 13/5$

21. Find the equation of the line perpendicular to 3x + 4y = 12 passing through (4, 4)

$y = 4/3x - 4/3$

22. Find the equation of the line perpendicular to 6x - y = 3 passing through (1, -2)

$y = -1/6x - 11/6$

23. Find the equation of the line perpendicular to y = 7x - 2 passing through (0, 5)

$y = -1/7x + 5$

24. Find the equation of the line perpendicular to y = -1/2x + 3 passing through (4, -5)

$y = 2x - 13$

25. Find the equation of the line perpendicular to x - 3y = 6 passing through (3, 0)

$y = -3x + 9$

26. Find the equation of the line perpendicular to 2x + 7y = 14 passing through (-7, 2)

$y = 7/2x + 53/2$

27. Find the equation of the line perpendicular to y = 4 passing through (-3, 6)

$x = -3$

28. Find the equation of the line perpendicular to x = -1 passing through (2, 2)

$y = 2$

MASTER QUESTIONS

M1. A line passes through the points (1, 2) and (3, 8). Find the equation of the line perpendicular to it that passes through (2, 4).

$y = -1/3x + 14/3$

M2. The line L has equation 3x - 4y = 12. Find the equation of the line perpendicular to L that passes through the midpoint of (1, 5) and (7, -3).

$y = -4/3x + 8/3$

M3. A triangle has vertices at (0, 0), (4, 0), and (4, 3). Find the equation of the altitude from the origin.

$y = -4/3x$

M4. A rectangle has vertices at (1, 1), (5, 1), (5, 4), and (1, 4). Find the equation of the line perpendicular to the diagonal from (1, 1) to (5, 4) that passes through (3, 2.5).

$y = -4/3x + 6.5$

M5. The lines y = 2x + 1 and y = -1/2x + 4 intersect at point P. Find the equation of the line perpendicular to both that passes through P.

$y = -1/2x + 3$

M6. A parallelogram has sides with equations y = 2x + 1 and y = 2x - 3. Find the equation of one of its altitudes.

$y = -1/2x + c$

M7. The line segment AB has endpoints A(2, 3) and B(6, 7). Find the equation of the perpendicular bisector of AB.

$y = -x + 10$

M8. A right-angled triangle has vertices at (1, 2), (5, 6), and (3, 4). Show that the hypotenuse is perpendicular to one of the other sides.

Gradients are -1 and 1, product is -1

M9. The lines y = kx + 3 and y = (1/k)x - 2 are perpendicular. Find all possible values of k.

$k = 1$ or $k = -1$

M10. A square has diagonals that intersect at (3, 4). One diagonal has gradient 2. Find the equation of one side of the square.

$y = -1/2x + 11/2$