K EDUCATION CENTRE

Structured practice • Exam preparation • Independent learning

GCSE MATHEMATICS - HIGHER TIER

Linear Graphs

Exam-Style Assignment

STUDENT DETAILS	
Name:	_____
Date:	_____ Target grade / level: _____

ASSIGNMENT FOCUS

- Plot and interpret straight-line graphs of the form y = mx + c
- Find and interpret gradients and y-intercepts
- Find equations of lines from points, gradients and graphs
- Work with parallel and perpendicular lines
- Use linear graphs in coordinate-geometry and real-life contexts

Original K Education Centre questions informed by Pearson Edexcel GCSE Higher assessment style.

Section A - Core Linear Graph Skills

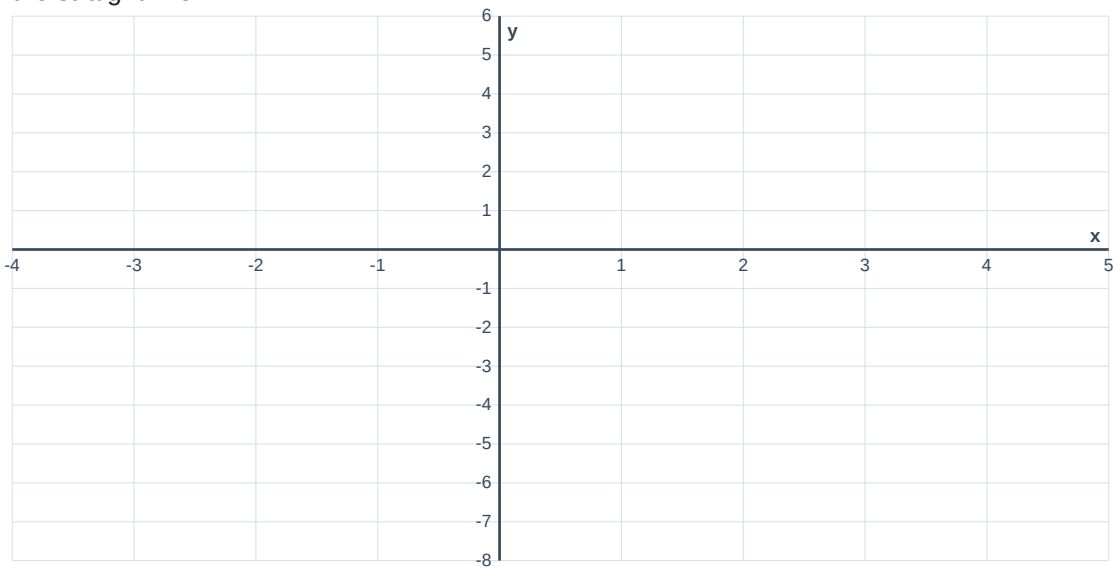
Work accurately with gradients, intercepts and straight-line graphs.

1. For the line y = 4x - 7, state (a) the gradient and (b) the y-intercept.

[2 marks]

Working / answer

2. Complete a table of values for y = 2x - 3 for x = -2, -1, 0, 1, 2 and 3. Plot the points on the grid and draw the straight line.



[4 marks]

Working / answer

3. The points A(-4, 5) and B(2, -7) lie on a straight line. Work out the gradient of AB.

[2 marks]

Working / answer

4. A straight line crosses the y-axis at 6 and has gradient -3. Write down the equation of the line.

[2 marks]

Working / answer

5. Rearrange 3x + 2y = 12 into the form y = mx + c. Hence state the gradient and y-intercept.

[3 marks]

Working / answer

Section B - Equations of Straight Lines

Find equations from coordinates and gradients. Give equations in the form y = mx + c unless told otherwise.

6. Find the equation of the straight line with gradient 5 that passes through the point (2, 13).

[3 marks]

Working / answer

7. Find the equation of the straight line through the points (-2, -1) and (4, 11).

[4 marks]

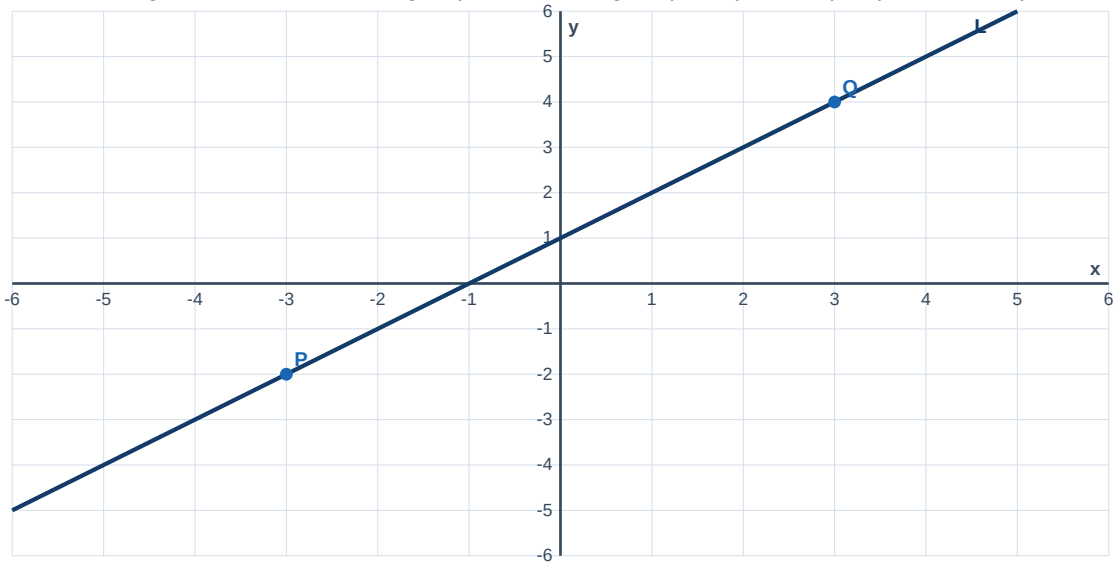
Working / answer

8. The line L passes through (3, 2) and (7, -6). Find an equation of L.

[4 marks]

Working / answer

9. The straight line shown on the grid passes through P(-3, -2) and Q(3, 4). Find its equation.



[4 marks]

Working / answer

10. A line has equation 4y = 12x - 20. Another line has the same y-intercept and gradient -2. Find the equation of the second line.

[3 marks]

Working / answer

Section C - Parallel and Perpendicular Lines

Use gradient relationships to construct and justify equations.

11. Line A has equation y = 3x - 8. Line B is parallel to A and passes through (4, 1). Find the equation of line B.

[3 marks]

Working / answer

12. The line P has equation 2y = 5x + 6. The line Q is parallel to P and passes through (-2, 7). Find the equation of Q.

[4 marks]

Working / answer

13. The straight line L has equation 3y = 4x + 7. The point A has coordinates (3, -5). Find an equation of the line perpendicular to L that passes through A.

[4 marks]

Working / answer

14. The line y = -2x + 5 and the line through A(1, 4) and B(5, 12) are given. Determine whether the two lines are parallel, perpendicular, or neither. Show your working.

[3 marks]

Working / answer

15. A line passes through (6, -1) and is perpendicular to the line 5x + 2y = 14. Find its equation.

[4 marks]

Working / answer

Section D - Graphical Reasoning and Applications

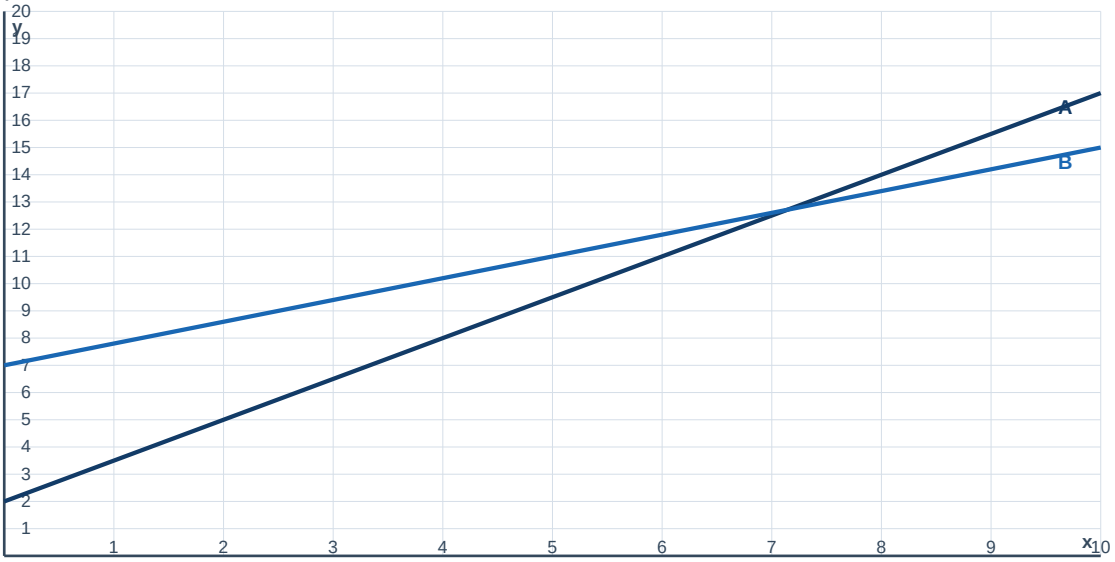
Use linear graphs to interpret rates of change and solve problems.

16. A taxi company charges a fixed booking fee plus a cost per mile. The total cost C pounds for d miles is modelled by C = 2.4d + 5. (a) Explain what 2.4 represents. (b) Explain what 5 represents. (c) Work out the cost of a 12-mile journey.

[4 marks]

Working / answer

17. Two phone plans are represented by the straight lines A and B on the graph. The horizontal axis represents data used (GB) and the vertical axis represents monthly cost (pounds). (a) Which plan has the greater cost per GB? Explain how the graph shows this. (b) Estimate the data usage at which the two plans cost the same.



[4 marks]

Working / answer

18. The lines y = 2x - 5 and y = -x + 7 intersect at point R. Without drawing the graphs, find the coordinates of R.

[3 marks]

Working / answer

19. A quantity y is directly proportional to x. The graph of y against x is a straight line through the origin and passes through (6, 15). (a) Find an equation connecting y and x. (b) Find y when x = 18. (c) Find x when y = 50.

[4 marks]

Working / answer

20. The points A(-4, 1), B(2, 10) and C(8, 19) are given. A student says that A, B and C lie on the same straight line. Is the student correct? You must justify your answer using gradients or line equations.

[4 marks]

Working / answer

Higher-Tier Challenge - Mixed Linear Graphs

These final tasks combine several linear-graph skills in one problem.

21. The line L1 has equation y = 0.5x + 7. The line L2 is perpendicular to L1 and passes through the point where L1 crosses the y-axis. Find the equation of L2.

[4 marks]

Working / answer

22. The straight line through A(-5, 7) and B(k, -5) has gradient -3. Find the value of k.

[3 marks]

Working / answer

23. A straight line has equation ax + 3y = 12, where a is a constant. The line is perpendicular to y = (3/2)x - 4. Find the value of a.

[4 marks]

Working / answer

24. Two straight lines have equations y = (p - 1)x + 6 and y = 3x - 8. The lines are parallel. Find p.

[2 marks]

Working / answer

Total: 81 marks

End of assignment