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| **UNIT 9: Real-life and algebraic linear graphs** |

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**SPECIFICATION REFERENCES**

N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate

A7 where appropriate, interpret simple expressions as functions with inputs and outputs

A8 work with coordinates in all four quadrants

A9 plot graphs of equations that correspond to straight-line graphs in the coordinate plane; …

A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically

A12 Recognise, sketch and interpret graphs of linear functions …

A14 plot and interpret … graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration

A17 solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph

R1 change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts

R11 use compound units such as speed, … unit pricing, …

R14 interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion

G11 solve geometrical problems on coordinate axes

G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

**PRIOR KNOWLEDGE**

Students should be able to plot coordinates and read scales

Students should be able to substitute into a formula.

**KEYWORDS**

Linear, graph, distance, time, coordinate, quadrant, real-life graph, gradient, intercept, function, solution, parallel

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| **9b. Straight-line graphs**  (A7, A9, A10, A12, A17) | **Teaching time**  5–7 hours |

**OBJECTIVES**

* By the end of the sub-unit, students should be able to:
* Use function machines to find coordinates (i.e. given the input *x*, find the output *y*);
* Plot and draw graphs of *y* = *a*, *x* = *a*, *y* = *x* and *y* = –*x*;
* Recognise straight-line graphs parallel to the axes;
* Recognise that equations of the form *y* = *mx* + *c* correspond to straight-line graphs in the coordinate plane;
* Plot and draw graphs of straight lines of the form *y* = *mx* + *c* using a table of values;
* Sketch a graph of a linear function, using the gradient and *y*-intercept;
* Identify and interpret gradient from an equation *y* = *mx* + *c*;
* Identify parallel lines from their equations;
* Plot and draw graphs of straight lines in the form *ax* + *by* = *c*;
* Find the equation of a straight line from a graph;
* Find the equation of the line through one point with a given gradient;
* Find approximate solutions to a linear equation from a graph.

**POSSIBLE SUCCESS CRITERIA**

Plot and draw the graph for *y* = 2*x* – 4.

Which of these lines are parallel: *y* = 2*x* + 3, *y* = 5*x* + 3, *y* = 2*x* – 9, 2*y* = 4*x* – 8

**OPPORTUNITIES FOR REASONING/PROBLEM SOLVING**

Students should be able to decide what the scales on any axis should in order to draw a correct graph.

**COMMON MISCONCEPTIONS**

When not given a table of values, students rarely see the relationship between the coordinate axes.

**NOTES**

Emphasise the importance of drawing a table of values when not given one.

Values for a table should be taken from the *x*-axis.