Thinking with Models _ Gradient & Equation of a line

Assessment Criterion: A and C

Criterion A: Knowing & Understanding

Level Band	Questions Mapped	Task-Specific Descriptor	Sample Student Response
1–2	Q1 & Q2	• Student selects inappropriate or incomplete mathematics when finding the equation of a line with a given gradient and point (Q1). • Student cannot identify that a line parallel to the x-axis has gradient 0 (Q2), and chooses an incorrect equation. • Solutions show major conceptual errors or guesses.	y = 6x + 18 Circles y = 3x
3–4	Q3	• Student selects some appropriate mathematics to verify the equation in Q3. • Substitution is done correctly OR partially correctly. • Reasoning shows understanding but is incomplete or not clearly justified.	5(3)+3 = 18 but the point is (3,16), so the equation is wrong." but simple
5–6	Q4	• Student correctly identifies gradients and y-intercepts from linear equations. • Successfully matches most or all equations with the correct gradient/intercept pair. • Minor errors in notation allowed, but understanding is clear.	y=3x → m=3, c=0 y=3x–5 → m=3, c=–5 y=0.3x+7 → m=0.3, c=7
7–8	Q5	• Student selects efficient and correct mathematics to model a real-life situation using linear functions. • Correctly calculates gradient from two data points. • Correctly computes y-intercept. • Writes a complete and correct linear model. • Uses the model to make an accurate prediction.	a) m = 50 b) C(x)=50x+400 c) C(15)=1150

Criterion C: Communicating

Level Band	Task-Specific Descriptor	Sample Student Response
1–2	• Uses **limited mathematical language** when describing gradient, point, or equation (Q1). • Misuses or omits notation such as *m, c, y-intercept*, or *parallel to x-axis* (Q2). • Mathematical representations (equations/tables) are unclear or incorrect. • Reasoning is incomplete or missing steps.	• Q1: Incorrect notation like *y = 6 + x18*. • Q2: No understanding of "parallel to x-axis." • Q3–Q5: Steps missing, unclear reasoning.
3–4	• Uses some correct vocabulary (gradient, intercept) but inconsistently (Q1–Q3). • Shows basic representations (equations, substitution) but with minor errors. • Attempts to connect forms, e.g., equation → point substitution (Q3). • Reasoning is partly structured but lacks clarity or justification.	• Q3: Substitutes x=3 correctly but explanation is brief. • Q4: Matches some equations but without explanation. • Q5: Writes gradient but missing explanation for intercept.
5–6	• Uses **appropriate mathematical language** accurately (gradient, intercept, model) in Q1–Q5. • Represents information logically using equations, substitutions, tables, or matching (Q1, Q4). • Moves between forms: point → equation, data → model (Q1, Q5). • Reasoning is mostly complete and coherent.	• Q1: Correct equation with steps. • Q3: Clear verification with substitution. • Q4: Correct matches with stated gradient/intercept. • Q5: Nearly correct model; explanation mostly clear.
7–8	• Uses **precise and consistent mathematical language and symbols** throughout Q1–Q5. • Selects **the most effective representations** (equations, tables, structured models). • Easily transitions between forms: contextual data → gradient → equation → prediction (Q5). • Communicates **complete, concise, logically sequenced** reasoning. • Work is professionally organized.	• Q1: Clearly written equation with labelled gradient & intercept. • Q3: Full justification of verification. • Q4: Accurate matching with explanation. • Q5: Structured model: gradient → intercept → equation → cost prediction → interpretation.