St Mary's

Analytic Rubric — Teacher Copy

Mathematics · Formation and solution of quadratic equations · Critical Thinking & Problem Solving · Nairobi County

TPAD Evidence — CBE Assessment · Mathematics · Formation and solution of quadratic equations · 20 March 2026 · Ref: ASSESSKE-MAT-G10-RUB-20260320

Teacher: **Hesabu Daima**

Date: 20 March 2026

Competency: Apply algebraic reasoning to construct and solve quadratic equations from real-world contexts using factorisation, completing the square, and the quadratic formula, and interpret solutions in relation to the original problem.

Criterion	EE Exceeding Expectations AL 7–8	ME Meeting Expectations AL 5–6	AE Approaching Expectations AL 3–4	BE Below Expectations AL 1–2
C1 **Problem Analysis and Equation Formation** Analysing real-world contexts to extract relevant information and translate into quadratic equations 30%	AL 7–8 Systematically identifies all relevant variables and constraints in each scenario, translates complex relationships into accurate quadratic equations with complete variable definitions, and justifies equation formation with logical reasoning connecting mathematical symbols to real-world quantities.	AL 5–6 Identifies key variables and relationships in most scenarios, forms correct quadratic equations for at least two contexts with appropriate variable definitions, and provides basic reasoning for equation setup.	AL 3–4 Recognises some relevant information from scenarios, attempts to form quadratic equations with partially correct structure for at least one context, and shows emerging understanding of translating word problems to mathematical expressions.	AL 1–2 Attempts to identify information from at least one scenario, writes mathematical expressions that show awareness of quadratic structure even if incomplete or incorrect, and demonstrates initial effort in connecting words to mathematical symbols.
C2 **Solution Method Selection and Application** Choosing appropriate solution methods and executing algebraic procedures accurately 25%	AL 7–8 Selects optimal solution methods for each equation type, executes factorisation, completing the square, or quadratic formula with complete accuracy, and demonstrates fluency across multiple solution techniques with clear algebraic steps.	AL 5–6 Chooses appropriate solution methods for most equations, applies algebraic procedures correctly with minor computational errors, and completes solution processes for at least two scenarios.	AL 3–4 Attempts suitable solution methods, follows algebraic procedures with some accuracy, and reaches partial solutions showing understanding of at least one solution technique.	AL 1–2 Attempts at least one solution method, shows awareness of algebraic steps even if execution contains errors, and demonstrates basic understanding of quadratic solution processes.
C3	AL 7–8	AL 5–6	AL 3–4	AL 1–2

Criterion	EE Exceeding Expectations AL 7–8	ME Meeting Expectations AL 5–6	AE Approaching Expectations AL 3–4	BE Below Expectations AL 1–2
Solution Interpretation and Contextual Validation Evaluating mathematical solutions within the original real-world context **25%**	Interprets all solutions within original contexts, evaluates feasibility by checking against real-world constraints, rejects impossible solutions with clear reasoning, and explains practical meaning of valid solutions with appropriate units and context.	Interprets solutions for most scenarios, identifies when solutions are contextually reasonable, provides explanations connecting mathematical answers to original problems with mostly correct units.	Attempts to interpret solutions in context for at least one scenario, shows awareness that mathematical solutions need contextual checking, and makes basic connections between answers and original situations.	Attempts to relate mathematical answers to at least one original problem, shows initial understanding that solutions have real-world meaning, and demonstrates effort in contextual thinking even if interpretations are incomplete.
C4 **Mathematical Communication and Reasoning** Clearly communicating mathematical thinking and justifying problem-solving approaches **20%**	**AL 7–8** Presents solutions with clear logical sequence, uses precise mathematical language and notation consistently, provides complete justifications for method choices, and communicates reasoning that others can easily follow and verify.	**AL 5–6** Organises work in logical steps, uses mathematical notation correctly in most instances, provides basic explanations for solution approaches, and communicates thinking clearly enough for others to understand main ideas.	**AL 3–4** Shows some organisation in presenting work, uses mathematical symbols with emerging accuracy, attempts to explain reasoning for at least one solution approach, and demonstrates developing communication skills.	**AL 1–2** Attempts to organise mathematical work, shows effort in using mathematical notation even if inconsistent, demonstrates willingness to explain thinking, and communicates basic mathematical ideas with beginning clarity.

COMMON ERRORS — AE/BE WORK

C1 — Problem Analysis and Equation Formation: Misidentifying variables, incorrect translation of constraints, omitting units or context in variable definitions
C2 — Solution Method Selection and Application: Computational errors in factoring, sign errors in quadratic formula, incomplete algebraic manipulation
C3 — Solution Interpretation and Contextual Validation: Accepting negative time or distance values, ignoring units, failing to consider practical constraints
C4 — Mathematical Communication and Reasoning: Unclear notation, missing steps in reasoning, inadequate explanation of method choices

Grade calibration: *Weight process and skill acquisition heavily. Growth evidence matters as much as product quality. AL 1-2 descriptors must reflect minimal attempt with dignity, never failure.*