GRADE 9 · GEC 2026 PREDICTION

# Mathematics Paper 1 Memorandum

Numbers, Operations and Relationships · Patterns, Functions and Algebra

**TOTAL** 75 marks **TIME** 2 hours 30 minutes (+ 15 minutes reading time)

Prepared by Daniel Simons (Danemathics)

*An unofficial prediction paper in the format of the GEC Mathematics Paper 1. It is not set by the Department of Basic Education.*

- Section A: one mark for each correct answer. There are no half marks.
- Section B: one ✓ = one mark. Accept any other mathematically correct method; consistent accuracy applies.
- Every Section A question has a short worked answer, so a learner can see WHY the option is right.

## SECTION A — ANSWER KEY

| No. | Ans | No. | Ans | No. | Ans | No. | Ans | No. | Ans | No. | Ans |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D | 11 | D | 21 | C | 31 | D | 41 | A | 51 | A |
| 2 | B | 12 | C | 22 | B | 32 | A | 42 | B | 52 | B |
| 3 | B | 13 | D | 23 | C | 33 | D | 43 | C | 53 | C |
| 4 | C | 14 | B | 24 | D | 34 | A | 44 | B | 54 | C |
| 5 | D | 15 | C | 25 | A | 35 | B | 45 | A | 55 | A |
| 6 | D | 16 | C | 26 | D | 36 | C | 46 | D | 56 | A |
| 7 | B | 17 | A | 27 | B | 37 | D | 47 | A | 57 | C |
| 8 | A | 18 | A | 28 | D | 38 | B | 48 | D | 58 | C |
| 9 | C | 19 | D | 29 | B | 39 | A | 49 | C | 59 | B |
| 10 | A | 20 | C | 30 | B | 40 | D | 50 | A | 60 | B |

## SECTION A — WORKED ANSWERS

| No. | Answer | Working |
|---|---|---|
| **1.** | **D** 2,5 | −7 and $\sqrt{9}$ = 3 are integers, and $\sqrt{5}$ is irrational.<br>2,5 = $\frac{5}{2}$ is rational but not an integer. |
| **2.** | **B** 360 | 24 = 2 × 2 × 2 × 3; 90 = 2 × 3 × 3 × 5<br>LCM = $2^3 \times 3^2 \times 5 = 360$ |
| **3.** | **B** 42 | $84 = 2^2 \times 3 \times 7$; $126 = 2 \times 3^2 \times 7$; $210 = 2 \times 3 \times 5 \times 7$<br>HCF = 2 × 3 × 7 = 42 |
| **4.** | **C** 15 days | Indirect proportion: fewer workers need more days.<br>6 × 10 = 60 worker-days; 60 ÷ 4 = 15 days |
| **5.** | **D** 11:45 | Time = distance ÷ speed = $\frac{405}{90}$ = 4,5 h = 4 h 30 min<br>07:15 + 4 h 30 min = 11:45 |
| **6.** | **D** Option A, by R102,88 | Option A: $I$ = 10 000 × 0,09 × 3 = R2 700,00<br>Option B: $A = 10\,000(1{,}08)^3$ = R12 597,12, so $I$ = R2 597,12<br>R2 700,00 − R2 597,12 = R102,88 more with Option A |

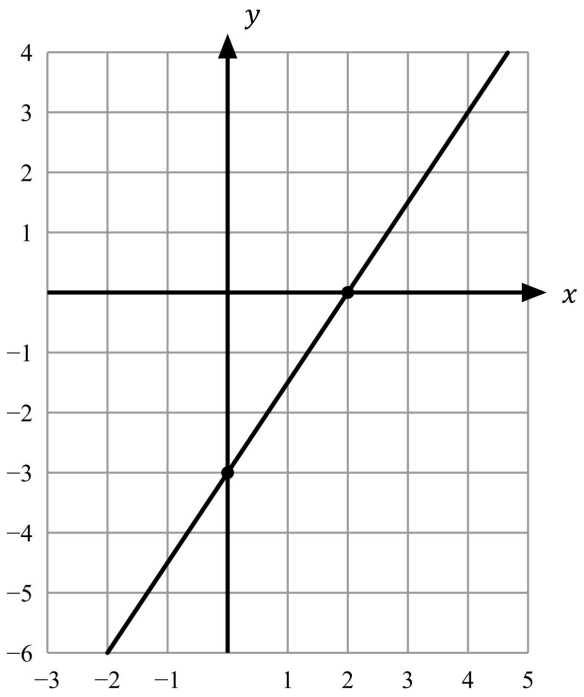
| No. | Answer | Working |
|---|---|---|
| **7.** | **B** $-4(5+2) = (-4)(5) + (-4)(2)$ | A factor multiplied over a sum: the distributive property.<br>The others show the commutative and associative properties and an additive inverse. |
| **8.** | **A** $-\frac{3}{2}$ | $-\frac{2}{3} \times (-\frac{3}{2}) = 1$, so the inverse is $-\frac{3}{2}$ |
| **9.** | **C** $-7$ | $= 6 + (-20) + 7$<br>$= -7$ |
| **10.** | **A** 11 | $\frac{2(-27)-12}{-6} = \frac{-66}{-6} = 11$ |
| **11.** | **D** 15 | $= -5 + 12 - (-8)$<br>$= 15$ |
| **12.** | **C** $\frac{7}{9}$ | $\frac{9-2}{25-16} = \frac{7}{9}$ |
| **13.** | **D** $18a^3b^6$ | $= 9a^4b^6 \times 2a^{-1}$<br>$= 18a^3b^6$ |
| **14.** | **B** $\frac{x^2}{4}$ | $= 2^{-2}x^6 \div x^4 = \frac{x^2}{4}$ |
| **15.** | **C** 3 | $= 1 + \frac{1}{9} \times 9 + 1$<br>$= 3$ |
| **16.** | **C** $1{,}496 \times 10^8$ km | 149 600 000 = 1,496 × 100 000 000 = $1{,}496 \times 10^8$ |
| **17.** | **A** $1{,}2 \times 10^4$ | $= 12 \times 10^3$<br>$= 1{,}2 \times 10^4$ |
| **18.** | **A** $\frac{15}{24}$ | Numerators increase by 3 and denominators by 5:<br>next term $\frac{12+3}{19+5} = \frac{15}{24}$ |
| **19.** | **D** 81 | Figures 1, 2, 3 have 5 ; 9 ; 13 tiles: each figure adds 4<br>$T_n = 4n + 1$, so $T_{20} = 4(20) + 1 = 81$ |
| **20.** | **C** Figure 31 | $4n + 1 = 125$<br>$4n = 124$, so $n = 31$ |
| **21.** | **C** Multiply the previous term by 3. | $2 \times 3 = 6$; $6 \times 3 = 18$; $18 \times 3 = 54$ |
| **22.** | **B** $T_n = 2n^2 - 1$ | $T_1 = 2(1)^2 - 1 = 1$; $T_2 = 2(2)^2 - 1 = 7$<br>$T_3 = 2(3)^2 - 1 = 17$; $T_4 = 2(4)^2 - 1 = 31$ |
| **23.** | **C** $4a^2b$ and $a^2b$ | Like terms have the same variables with the same exponents. |
| **24.** | **D** $-1$ | $-x^2 = -1 \times x^2$ |
| **25.** | **A** $x^2 - 4x + 7$ | A trinomial has three terms: $x^2$, $-4x$ and 7. |
| **26.** | **D** $-x^2 + 8x$ | $= -6x^2 + 8x + 5x^2$<br>$= -x^2 + 8x$ |
| **27.** | **B** $4x^2 - 20x + 25$ | $= (2x - 5)(2x - 5)$<br>$= 4x^2 - 10x - 10x + 25 = 4x^2 - 20x + 25$ |
| **28.** | **D** $3x^2 - 10x - 8$ | $= 3x^2 - 12x + 2x - 8$<br>$= 3x^2 - 10x - 8$ |
| **29.** | **B** 13 | $(-2)^3 - 2(-2)(3) + (3)^2$<br>$= -8 + 12 + 9 = 13$ |

| No. | Answer | Working |
|---|---|---|
| **30.** | **B** $2x + 3$ | $\frac{6x^2}{3x} + \frac{9x}{3x} = 2x + 3$ |
| **31.** | **D** $(7x - 4y)(7x + 4y)$ | Difference of two squares: $(7x)^2 - (4y)^2$ |
| **32.** | **A** $(x - 7)(x + 4)$ | Factors of −28 that add up to −3: −7 and 4 |
| **33.** | **D** $3(x + 2)(x + 3)$ | $= 3(x^2 + 5x + 6)$<br>$= 3(x + 2)(x + 3)$ |
| **34.** | **A** $(x - 5)(2x + 3)$ | $= 2x(x - 5) + 3(x - 5)$<br>$= (x - 5)(2x + 3)$ |
| **35.** | **B** $\frac{x-3}{x-2}$ | $= \frac{(x-3)(x+3)}{(x+3)(x-2)} = \frac{x-3}{x-2}$ |
| **36.** | **C** $x = 1$ | × 12: $3(x + 3) - 4(x - 1) = 12$<br>$3x + 9 - 4x + 4 = 12$<br>$-x = -1$, so $x = 1$ |
| **37.** | **D** $x = -3$ | $-2x - 3x = 20 - 5$<br>$-5x = 15$, so $x = -3$ |
| **38.** | **B** $(x + 5) + (3x + 5) = 62$ | In 5 years: Thabo $x + 5$, his father $3x + 5$<br>$(x + 5) + (3x + 5) = 62$ $(x = 13)$ |
| **39.** | **A** $x = 3$ | $3^{x+1} = 3^4$<br>$x + 1 = 4$, so $x = 3$ |
| **40.** | **D** $x = -1$ | $2^{2x-1} = 2^{-3}$<br>$2x - 1 = -3$, so $x = -1$ |
| **41.** | **A** 35 | $95 = \frac{9}{5}C + 32$<br>$63 = \frac{9}{5}C$, so $C = 63 \times \frac{5}{9} = 35$ |
| **42.** | **B** $x = -2$ or $x = 4$ | $3x + 6 = 0$ or $x - 4 = 0$<br>$x = -2$ or $x = 4$ |
| **43.** | **C** $x = 7$ or $x = -2$ | $x^2 - 5x - 14 = 0$<br>$(x - 7)(x + 2) = 0$, so $x = 7$ or $x = -2$ |
| **44.** | **B** $x = 0$ or $x = 3$ | $4x^2 - 12x = 0$<br>$4x(x - 3) = 0$, so $x = 0$ or $x = 3$ (do not divide by $x$: that loses $x = 0$) |
| **45.** | **A** 8 | $n(n + 1) = 56$, so $n^2 + n - 56 = 0$<br>$(n + 8)(n - 7) = 0$: $n = 7$ (positive), so the integers are 7 and 8 |
| **46.** | **D** (−1 ; 5) | $y = -3(-1) + 2 = 5$, so (−1 ; 5) lies on the line |
| **47.** | **A** −7 | $5 \times (-2) + 3 = -10 + 3 = -7$ |
| **48.** | **D** $y = 3x - 4$ | $y$ increases by 3 each time $x$ increases by 1, and $y = -4$ when $x = 0$:<br>$y = 3x - 4$ |
| **49.** | **C** 7 | $-2m + 5 = -9$<br>$-2m = -14$, so $m = 7$ |
| **50.** | **A** Multiply the input value by −2 and add 5 to get the output value. | $y = -2x + 5$ |
| **51.** | **A** $C = 80h + 150$ | R80 for each of the $h$ hours, plus the fixed R150 |
| **52.** | **B** 4 to 7 minutes | The graph is horizontal from 4 minutes to 7 minutes. |

| No. | Answer | Working |
|---|---|---|
| **53.** | **C** The number of learners in each class of a school | Learners are counted in whole numbers; the others change continuously. |
| **54.** | **C** $\frac{3}{2}$ | Through (−2 ; 0) and (0 ; 3): gradient = $\frac{3-0}{0-(-2)} = \frac{3}{2}$ |
| **55.** | **A** (5 ; 0) | At the $x$-intercept $y = 0$: $2x = 10$, so $x = 5$ |
| **56.** | **A** $y = -2x + 4$ | $y = mx + c$ with $m = -2$ and $c = 4$ |
| **57.** | **C** | $y$-intercept 2 and gradient −1: the line falls from (0 ; 2) to (2 ; 0). |
| **58.** | **C** −2 | $m = \frac{-3-5}{3-(-1)} = \frac{-8}{4} = -2$ |
| **59.** | **B** $y = -4$ | A line parallel to the $x$-axis is horizontal: every point on it has $y = -4$. |
| **60.** | **B** $y = 3x + 4$ | Parallel lines have the same gradient: $m = 3$<br>$g$ cuts the $y$-axis at 4: $y = 3x + 4$ |

## SECTION B

| | | | |
|---|---|---|---|
| **61** | $\frac{(-2)^3x^9y^{-3}}{4x^5y^{-6}} = \frac{-8x^9y^{-3}}{4x^5y^{-6}}$ ✓<br>$= -2x^{9-5}y^{-3+6}$ ✓<br>$= -2x^4y^3$ ✓ | ✓ $(-2)^3 = -8$ and $x^9y^{-3}$<br>✓ $-8 \div 4 = -2$<br>✓ $x^4y^3$ | (3) |
| **62** | $= \frac{(x-2)(x+2)}{(x+2)(x+3)} \times \frac{x+3}{x-2}$ ✓✓<br>$= 1$ ✓ | ✓✓ both factorisations<br>✓ × the reciprocal; answer 1 | (3) |
| **63** | Let the breadth be $x$ metres; the length is $(x + 4)$ metres.<br>$x(x + 4) = 96$ ✓<br>$x^2 + 4x - 96 = 0$ ✓<br>$(x + 12)(x - 8) = 0$ ✓<br>$x = 8$ $(x \neq -12)$: breadth 8 m and length 12 m ✓ | ✓ equation<br>✓ standard form<br>✓ factors<br>✓ answer | (4) |
| **64.1** | $x$-intercept $(y = 0)$: $3x = 6$, so (2 ; 0) ✓<br>$y$-intercept $(x = 0)$: $-2y = 6$, so (0 ; −3) ✓ | ✓ (2 ; 0)<br>✓ (0 ; −3) | (2) |

| | | | |
|---|---|---|---|
| **64.2** | <br>Both intercepts plotted ✓<br>Straight line drawn through them ✓ | ✓ intercepts plotted<br>✓ straight line | (2) |
| **64.3** | $m = \frac{0-(-3)}{2-0} = \frac{3}{2}$ ✓ | ✓ answer | (1) |
| | | **TOTAL** | **[15]** |

**TOTAL: 75**

## HOW THIS PAPER WAS PREDICTED

GEC Mathematics Paper 1 has been written three times (the 2023 and 2024 pilot studies and the 2025 national paper), each time with the same shape: 60 one-mark multiple-choice questions in a fixed topic order, then 15 marks of written work. This paper keeps that order and the number of questions in each block. It also asks the scope's skills that the 2025 paper left out: scientific notation, global graphs, discrete and continuous data, and indirect proportion.

| Questions | Topic | 2023 | 2024 | 2025 | This paper |
|---|---|---|---|---|---|
| 1 – 6 | Numbers: real numbers, LCM and HCF, proportion, rate, finance | 6 | 6 | 6 | 6 |
| 7 – 8 | Properties of numbers; inverses | 2 | 2 | 2 | 2 |
| 9 – 11 | Calculations with integers, squares, cubes and roots | 3 | 3 | 3 | 3 |
| 12 – 17 | Exponents and scientific notation | 7 | 7 | 4 | 6 |
| 18 – 22 | Numeric and geometric patterns | 4 | 4 | 7 | 5 |
| 23 – 25 | Algebraic language | 3 | 3 | 3 | 3 |
| 26 – 30 | Expand, simplify and substitute | 5 | 5 | 5 | 5 |
| 31 – 35 | Factorise; algebraic fractions | 5 | 5 | 5 | 5 |
| 36 – 46 | Algebraic equations | 11 | 11 | 11 | 11 |
| 47 – 51 | Functions and relationships (flow diagrams, tables) | 6 | 5 | 5 | 5 |
| 52 – 60 | Graphs (global and straight-line graphs) | 8 | 9 | 9 | 9 |
| 61 – 64 | Section B: exponents · fraction or equation · word problem · graph | 15 | 15 | 15 | 15 |

| Cognitive level | Marks | % of paper | CAPS target |
|---|---|---|---|
| 1. Knowledge | 19 | 25% | 25% |
| 2. Routine procedures | 36 | 48% | 45% |
| 3. Complex procedures | 14 | 19% | 20% |
| 4. Problem solving | 6 | 8% | 10% |
| TOTAL | 75 | 100% | 100% |

| Paper 1 scope: skill assessed | Questions |
|---|---|
| Real number system | 1 |
| Prime factors for LCM and HCF | 2, 3 |
| Ratio, rate, direct and indirect proportion, finance | 4, 5, 6 |
| Properties of integers; additive and multiplicative inverses | 7, 8 |
| Four operations with integers; squares, cubes and roots | 9 – 12 |
| Laws of exponents; scientific notation | 13 – 17, 61 |
| Numeric and geometric patterns; general rules in words and algebra | 18 – 22 |
| Algebraic language: terms, coefficients, monomials to trinomials | 23 – 25 |
| Expand, square a binomial, substitute | 26 – 29 |
| Factorise: common factor, difference of squares, trinomials | 31 – 34 |
| Simplify algebraic fractions using factorisation | 30, 35, 62 |
| Equations: inspection, setting up, factorising, exponents, ordered pairs | 36 – 46, 63 |
| Input and output values; equivalent forms | 47 – 51 |
| Global graphs: constant, increasing, decreasing; discrete and continuous | 52, 53 |
| Straight lines: intercepts, gradient, equations, drawing | 54 – 60, 64 |