SMARTWIZ

GRADE 9 MATHEMATICS EXAM

MARKS: 100

MARKS	

TIME: 2 hours

SCHOOL_____

CLASS (e.g. 4A) _____

SURNAME_____

NAME_____

Instructions for Students:

> Read all instructions carefully before beginning the exam.

> Write your name and student ID clearly on the answer sheet/booklet.

> Answer all questions unless otherwise stated.

> Show all your work/calculations where applicable.

> Write clearly and legibly.

> Use blue or black ink only. * Do not use correction fluid/tape.

> No electronic devices (calculators, phones, etc.) are allowed unless explicitly permitted.

> Raise your hand if you have any questions.

> Do not talk to other students during the exam.

> Any form of cheating will result in disqualification.

This test consists of 8 pages, excluding the cover page.

➕ SECTION A: WHOLE NUMBERS, RATIONALS & REAL NUMBERS (20 MARKS)

1. Classify the following numbers as: natural, whole, integer, rational, or irrational.
a) 2\sqrt{2}2 _____
b) −5-5−5 _____
c) 78\frac{7}{8}87 _____
d) 000 _____
(4)

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2. Convert to decimal form:
a) 34=\frac{3}{4} =43= _____
b) 75=\frac{7}{5} =57= _____
(2)

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3. Order the following numbers from smallest to largest:
−3,12,0,−1.5,2-3, \frac{1}{2}, 0, -1.5, 2−3,21,0,−1.5,2

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(3)

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4. Round off:
a) Round 473 to the nearest hundred: _____
b) Round 15.786 to 1 decimal place: _____
(2)

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5. Estimate:
Estimate 89×2189 \times 2189×21 using rounding:

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(2)

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6. Scientific notation:
a) Write 0.00034 in scientific notation: _____

b) Write 5.3×1045.3 \times 10^45.3×104 in standard form: _____
(2)

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7. Use a calculator to solve:
a) 21.4×5.67.3=\frac{21.4 \times 5.6}{7.3} =7.321.4×5.6= _____
(1)

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8. Cube roots:
a) 1253=\sqrt[3]{125} =3125= _____
(1)

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9. Is the following statement true or false? Justify.
"The square root of a negative number is a real number."

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(3)

SECTION B: AREA & VOLUME (25 MARKS)

1. Area of 2D shapes:
a) Find the area of a rectangle: length = 6 m, width = 4 m

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b) Area of triangle: base = 5 cm, height = 8 cm

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(4)

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2. Composite shape:
A shape consists of a rectangle (10 cm × 6 cm) with a semicircle on one side (radius = 3 cm).
a) Area of rectangle: _____
b) Area of semicircle (use π=3.14\pi = 3.14π=3.14):

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c) Total area: _____
(6)

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3. Volume:
Find the volume of a cylinder with radius 3 cm and height 7 cm
Use $\pi=3.14\backslash pi = 3.14\pi=3.14$

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(3)

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4. Surface area of a cube:
Side length = 5 cm

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(2)

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5. Convert units:
a) Convert 3000 cm^3 to litres: _____
b) Convert 2.5 m^2 to cm^2: _____
(2)

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6. Real-life application:
A rectangular pool is 8 m long, 5 m wide, and 2 m deep.
How many litres of water can it hold?

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(4)

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7. Missing dimensions:
The area of a rectangle is 48 m^2. If the width is 6 m, find the length.

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(2)

🧮 SECTION C: DATA HANDLING & PROBABILITY (25 MARKS)

1. Tally table:
Below is the number of books read by students:
3, 2, 4, 3, 5, 3, 4, 2, 5, 3, 1, 2
Create a tally and frequency table:
(5)

Books	Tally	Frequency
1		
2		
3		
4		
5		

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2. Mean, mode, median:
Use the above data
Mean: _____
Mode: _____
Median: _____
(6)

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3. Probability:
A bag contains 3 red, 2 blue, and 5 green marbles.
a) What is the total number of marbles? _____
b) Probability of drawing a green: _____
c) Probability of not drawing red: _____
(3)

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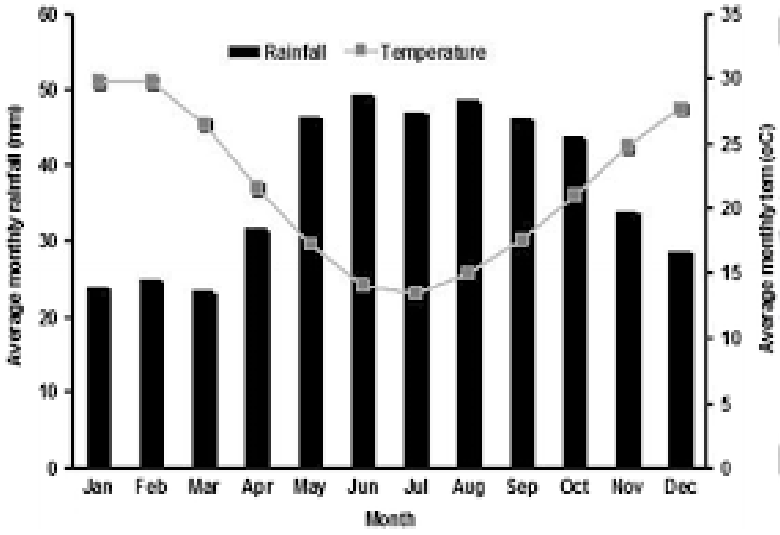
4. Pie chart interpretation:
In a survey of 100 learners:

- 30 walk to school
- 25 take the bus
- 20 use a taxi
- 25 use private cars

a) What percentage walk? _____

b) Draw a pie chart using this data (use protractor).
(5)

5. Weather data interpretation:
The bar graph shows average monthly rainfall:



a) Which month had the highest rainfall? _____
b) Estimate the total rainfall over 5 months: _____
(3)

6. Fair or unfair experiment?
Is rolling a normal dice a fair experiment? Why?

(3)

🧠 SECTION D: MISCELLANEOUS MIXED QUESTIONS (30 MARKS)

1. Temperature problem:
If the temperature was -3°C in the morning and rose by 9°C, what is the new temperature?

(2)

2. Financial literacy:
a) If a shirt costs R200 and is discounted by 15%, what is the price after discount?

b) VAT is 15%. What is the VAT on an item that costs R300?

(4)

3. Pattern rules:
A sequence is: 4, 8, 16, 32,...
a) Rule: _____
b) 7th term: _____
(3)

4. Equation puzzle:
If 3x+7=253x + 7 = 253x+7=25, what is the value of x?

(2)

5. Integer operations:
a) −7+4−(−2)=-7 + 4 - (-2) =−7+4−(−2)= _____
b) (−3)2−4=(-3)^2 - 4 =(−3)2−4= _____
(2)

6. Error spotting:
Find the error:
Learner says: “2x+3x=5x22x + 3x = 5x^22x+3x=5x2”
What is the mistake?

(2)

7. Challenge problem:
If x+y=10x + y = 10x+y=10 and x−y=2x - y = 2x−y=2, find the values of x and y.

(5)

TOTAL : 100

MEMO

➕ SECTION A: WHOLE NUMBERS, RATIONALS & REAL NUMBERS (20 MARKS)

1. Classify numbers:
a) 2\sqrt{2}2 — Irrational ✓
b) −5-5−5 — Integer ✓
c) 78\frac{7}{8}87 — Rational ✓
d) 000 — Whole number ✓

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2. Convert to decimals:
a) 34=0.75\frac{3}{4} = 0.7543=0.75 ✓
b) 75=1.4\frac{7}{5} = 1.457=1.4 ✓

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3. Order smallest to largest:
−3,−1.5,0,12,2-3, -1.5, 0, \frac{1}{2}, 2−3,−1.5,0,21,2 ✓

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4. Round off:
a) 473 → 500 (nearest hundred) ✓
b) 15.786 → 15.8 (1 decimal place) ✓

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5. Estimate:
Round 89 → 90, 21 → 20, estimate = 90×20=180090 \times 20 = 180090×20=1800 ✓

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6. Scientific notation:
a) 0.00034 = 3.4×10−43.4 \times 10^{-4}3.4×10−4 ✓
b) 5.3×104=53,0005.3 \times 10^{4} = 53,0005.3×104=53,000 ✓

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7. Calculator:
21.4×5.67.3=119.847.3≈16.42\frac{21.4 \times 5.6}{7.3} = \frac{119.84}{7.3} \approx 16.427.321.4×5.6 =7.3119.84≈16.42 ✓

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8. Cube root:
1253=5\sqrt[3]{125} = 53125=5 ✓

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9. True or false:
False. The square root of a negative number is not a real number; it is an imaginary number. ✓

📐 SECTION B: AREA & VOLUME (25 MARKS)

1. Area:
a) Rectangle = length × width = 6×4=24 m26 \times 4 = 24 \text{ m}^26×4=24 m2 ✓
b) Triangle = 12×5×8=20 cm2\frac{1}{2} \times 5 \times 8 = 20 \text{ cm}^221×5×8=20 cm2 ✓

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2. Composite shape:
a) Rectangle area = 10×6=60 cm210 \times 6 = 60 \text{ cm}^210×6=60 cm2 ✓
b) Semicircle area = 12πr2=12×3.14×32=14.13 cm2\frac{1}{2} \pi r^2 = \frac{1}{2} \times 3.14 \times 3^2 = 14.13 \text{ cm}^221πr2=21×3.14×32=14.13 cm2 ✓
c) Total area = 60+14.13=74.13 cm260 + 14.13 = 74.13 \text{ cm}^260+14.13=74.13 cm2 ✓

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3. Volume cylinder:
V=πr2h=3.14×32×7=197.82 cm3V = \pi r^2 h = 3.14 \times 3^2 \times 7 = 197.82 \text{ cm}^3V=πr2h=3.14×32×7=197.82 cm3 ✓

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4. Surface area cube:
6×52=6×25=150 cm26 \times 5^2 = 6 \times 25 = 150 \text{ cm}^26×52=6×25=150 cm2 ✓

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5. Convert units:
a) 3000 cm³ = 3 litres (1000 cm³ = 1 litre) ✓
b) 2.5 m2=2.5×10,000=25,000 cm22.5 \text{ m}^2 = 2.5 \times 10,000 = 25,000 \text{ cm}^22.5 m2=2.5×10,000=25,000 cm2 ✓

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6. Pool volume:
Volume = 8×5×2=80 m38 \times 5 \times 2 = 80 \text{ m}^38×5×2=80 m3
1 m³ = 1000 litres, so 80×1000=80,00080 \times 1000 = 80,00080×1000=80,000 litres ✓

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7. Missing dimension:
Area = length × width
48=l×6⇒l=486=8 m48 = l \times 6 \Rightarrow l = \frac{48}{6} = 8 \text{ m}48=l×6⇒l=648=8 m ✓

SECTION C: DATA HANDLING & PROBABILITY (25 MARKS)

1. Tally & frequency:

Books	Tally	Frequency
1	𝍸	1
2	𝍸𝍸	3
3	𝍸𝍸𝍸	5
4	𝍸𝍸	2
5	𝍸𝍸	2

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2. Mean, mode, median:

- Total sum = (1×1)+(2×3)+(3×5)+(4×2)+(5×2)=1+6+15+8+10=40(1 \times 1) + (2 \times 3) + (3 \times 5) + (4 \times 2) + (5 \times 2) = 1 + 6 + 15 + 8 + 10 = 40(1×1)+(2×3)+(3×5)+(4×2)+(5×2)=1+6+15+8+10=40
- Number of data points = 13
  Mean = 4013≈3.08\frac{40}{13} \approx 3.081340≈3.08 ✓
  Mode = 3 (most frequent) ✓
  Median = middle value when ordered: 1,2,2,2,3,3,3,3,3,4,4,5,5 → 7th value = 3 ✓

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3. Probability:
a) Total marbles = 3 + 2 + 5 = 10 ✓
b) P(green) = 510=12\frac{5}{10} = \frac{1}{2}105=21 ✓
c) P(not red) = 2+510=710\frac{2 + 5}{10} = \frac{7}{10}102+5=107 ✓

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4. Pie chart:
a) Percentage walking = 30100×100=30%\frac{30}{100} \times 100 = 30\%10030×100=30% ✓
b) (Pie chart drawn with correct angles:

- Walk: 30% → 108°
- Bus: 25% → 90°
- Taxi: 20% → 72°
- Cars: 25% → 90°) ✓

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5. Bar graph:
a) Highest rainfall month = (Answer depends on graph data given) ✓
b) Total rainfall = Sum of bar heights (estimate) ✓

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6. Fair experiment:
Yes, rolling a fair dice is a fair experiment because all outcomes have an equal chance (1/6) ✓

🧠 SECTION D: MISCELLANEOUS MIXED QUESTIONS (30 MARKS)

1. Temperature:
New temp = −3+9=6∘C-3 + 9 = 6^\circ \text{C}−3+9=6∘C ✓

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2. Financial literacy:
a) Discount = 15% of 200 = 0.15×200=300.15 \times 200 = 300.15×200=30
Price after discount = 200−30=R170200 - 30 = R170200−30=R170 ✓
b) VAT = 15% of 300 = 0.15×300=R450.15 \times 300 = R450.15×300=R45 ✓

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3. Pattern:
a) Rule: Multiply by 2 each time ✓
b) 7th term: 4×26=4×64=2564 \times 2^{6} = 4 \times 64 = 2564×26=4×64=256 ✓

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4. Equation:
3x+7=25⇒3x=18⇒x=63x + 7 = 25 \Rightarrow 3x = 18 \Rightarrow x = 63x+7=25⇒3x=18⇒x=6 ✓

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5. Integer operations:
a) −7+4−(−2)=−7+4+2=−1-7 + 4 - (-2) = -7 + 4 + 2 = -1−7+4−(−2)=−7+4+2=−1 ✓
b) (−3)2−4=9−4=5(-3)^2 - 4 = 9 - 4 = 5(−3)2−4=9−4=5 ✓

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6. Error spotting:
Mistake: 2x+3x=5x2x + 3x = 5x2x+3x=5x, not 5x25x^25x2 ✓

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7. Challenge problem:
x+y=10x + y = 10x+y=10
x−y=2x - y = 2x−y=2
Add: 2x=12⇒x=62x = 12 \Rightarrow x = 62x=12⇒x=6
Substitute: 6+y=10⇒y=46 + y = 10 \Rightarrow y = 46+y=10⇒y=4 ✓

TOTAL : 100