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: INTEGER LAWS & EXPONENTS (20 MARKS)

1. Apply integer rules:
a) (−6)×4÷(−3)=(-6) \times 4 \div (-3) =(−6)×4÷(−3)=

b) −8+12−15=-8 + 12 - 15 =−8+12−15=

(4)

2. Simplify using exponent laws:
a) 32×34=3^2 \times 3^4 =32×34=

b) 5652=\frac{5^6}{5^2} =5256=

c) (23)2=(2^3)^2 =(23)2=

(6)

3. Write in exponential form and simplify:
a) 2×2×2×2=2 \times 2 \times 2 \times 2 =2×2×2×2=

b) (x2y)3=(x^2y)^3 =(x2y)3=

(4)

4. Evaluate without a calculator:
a) (−2)3+42=(-2)^3 + 4^2 =(−2)3+42=

b) 49+81=\sqrt{49} + \sqrt{81} =49+81=

(6)

📏 SECTION B: RATIO, RATES & PROPORTION (25 MARKS)

1. Ratio simplification:
a) Simplify 18:24

b) Write the ratio of boys to girls if there are 15 boys and 10 girls.

(4)

2. Divide R300 in the ratio 2:3:

(3)

3. Speed, Distance & Time:
A car travels 240 km in 3 hours.
a) What is the average speed?

b) How far will it go in 5 hours?

(4)

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4. Proportions:
a) If 5 apples cost R15, how much do 8 apples cost?

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b) If 3 pens cost R21, what is the cost of 10 pens?

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(4)

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5. Map scales:
On a map, 1 cm represents 50 km.
a) What is the real distance if the map shows 3.2 cm?

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b) If two cities are 450 km apart, how many cm is that on the map?

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(4)

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6. Exchange rates:
If 1 USD = R18.50
a) Convert R370 to USD

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b) Convert $100 to rands

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(6)

📐 SECTION C: TRANSFORMATIONS & SYMMETRY (20 MARKS)

1. Reflection:
If a point A(3, 2) is reflected over the y-axis, what are the new coordinates?

(2)

2. Rotation:
Rotate the point B(1, 4) 90° clockwise around the origin.

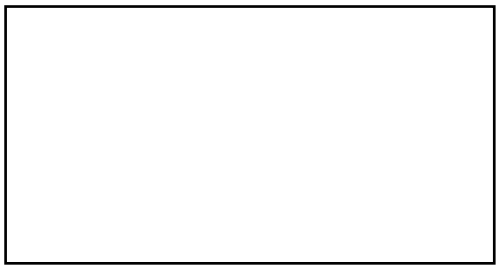
(2)

3. Translation:
Translate the point C(-2, 1) by 3 units right and 2 units down.

(2)

4. Line symmetry:
a) How many lines of symmetry does a square have?

b) Draw and label 2 lines of symmetry on a rectangle:



(4)

5. Identify transformation:
Match each diagram with its transformation type:

a) Slide ()
b) Flip ()
c) Turn ()
(3)

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6. Enlargement:
If a triangle with sides 3 cm, 4 cm, 5 cm is enlarged by a scale factor of 2:
a) What are the new side lengths?

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(3)

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7. Rotational symmetry:
State the order of rotational symmetry of an equilateral triangle:

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(2)

📊 SECTION D: STATISTICS & REPRESENTATION (15 MARKS)

1. Organising data:
The following are test scores:
35, 45, 50, 45, 60, 55, 50, 65
a) Mode: _____
b) Median: _____
c) Range: _____
d) Mean: _____
(6)

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2. Class intervals:
Complete the frequency table:

Interval	Frequency
0–9	3
10–19	5
20–29	6

30–39	1
Total	____

(2)

3. Data analysis:
a) What is a histogram used for?

b) What kind of data is best shown on a pie chart?

(4)

4. Stem-and-leaf diagram:
Complete the stem-and-leaf for the data:
43, 45, 41, 47, 44, 42

Stem	Leaf
4	_____

(3)

TOTAL : 100

MEMO

📘 SECTION A: INTEGER LAWS & EXPONENTS (20 MARKS)

1. Integer rules: (4)
a) (−6)×4÷(−3)=−24÷−3=8(-6) \times 4 \div (-3) = -24 \div -3 = 8(−6)×4÷(−3)=−24÷−3=8 ✓✓
b) −8+12−15=−11-8 + 12 - 15 = -11−8+12−15=−11 ✓✓

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2. Exponent laws: (6)
a) 32×34=363^2 \times 3^4 = 3^{6}32×34=36 ✓
b) 5652=54\frac{5^6}{5^2} = 5^45256=54 ✓
c) (23)2=26=64(2^3)^2 = 2^6 = 64(23)2=26=64 ✓✓

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3. Exponential form: (4)
a) 2×2×2×2=242 \times 2 \times 2 \times 2 = 2^42×2×2×2=24 ✓
b) (x2y)3=x6y3(x^2y)^3 = x^6y^3(x2y)3=x6y3 ✓✓

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4. Evaluate: (6)
a) (−2)3+42=−8+16=8(-2)^3 + 4^2 = -8 + 16 = 8(−2)3+42=−8+16=8 ✓✓
b) 49+81=7+9=16\sqrt{49} + \sqrt{81} = 7 + 9 = 1649+81=7+9=16 ✓✓

📏 SECTION B: RATIO, RATES & PROPORTION (25 MARKS)

1. Ratios: (4)
a) 18:24 = 3:4 ✓
b) 15:10 = 3:2 ✓

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2. Divide R300 in ratio 2:3:
Total parts = 5
2 parts = R120 ✓
3 parts = R180 ✓

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3. Speed, Distance, Time: (4)
a) 2403=80 km/h\frac{240}{3} = 80 \, \text{km/h}3240=80km/h ✓
b) 80×5=400 km80 \times 5 = 400 \, \text{km}80×5=400km ✓

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4. Proportions: (4)
a) 155=3⇒8×3=R24\frac{15}{5} = 3 \Rightarrow 8 \times 3 = R24515=3⇒8×3=R24 ✓✓
b) 1 pen = R7 → 10 pens = R70 ✓✓

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5. Map scales: (4)
a) 3.2×50=160 km3.2 \times 50 = 160 \, \text{km}3.2×50=160km ✓
b) 45050=9 cm\frac{450}{50} = 9 \, \text{cm}50450=9cm ✓

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6. Exchange rates: (6)
a) 37018.5=20 USD\frac{370}{18.5} = 20 \, \text{USD}18.5370=20USD ✓
b) 100×18.5=R1850100 \times 18.5 = R1850100×18.5=R1850 ✓

📐 SECTION C: TRANSFORMATIONS & SYMMETRY (20 MARKS)

1. Reflection: (2)
A(3, 2) → A'(-3, 2) ✓

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2. Rotation 90° clockwise: (2)
B(1, 4) → B'(4, -1) ✓

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3. Translation: (2)
C(-2, 1) → C'(1, -1) ✓

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4. Symmetry: (4)
a) Square: 4 lines ✓
b) Two lines shown correctly: vertical & horizontal ✓✓

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5. Identify transformation: (3)
a) Slide → Translation ✓
b) Flip → Reflection ✓
c) Turn → Rotation ✓

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6. Enlargement: (3)
New sides: 6 cm, 8 cm, 10 cm ✓✓✓

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7. Rotational symmetry: (2)
Order = 3 ✓

📊 SECTION D: STATISTICS & REPRESENTATION (15 MARKS)

1. Test scores: (6)
a) Mode: 45 ✓
b) Median: 47.5 → (45+50)/2 ✓
c) Range: 65 – 35 = 30 ✓
d) Mean = 35+45+50+45+60+55+50+658=4058=50.63\frac{35+45+50+45+60+55+50+65}{8} = \frac{405}{8} = 50.63835+45+50+45+60+55+50+65=8405=50.63 ✓✓

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2. Frequency table total: (2)
3+5+6+1=153 + 5 + 6 + 1 = 153+5+6+1=15 ✓

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3. Data analysis: (4)
a) A histogram shows frequency of data in intervals ✓✓
b) A pie chart shows percentage/fraction of parts in a whole ✓✓

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4. Stem-and-leaf diagram: (3)

Stem	Leaf
4	1 2 3 4 5 7 ✓✓✓

TOTAL :100