SMARTWIZ

GRADE 8 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 5 pages, excluding the cover page.

SECTION A: NUMBER, OPERATIONS AND GRAPHS (35 MARKS)

Question 1: Integers and Exponents (10 Marks)

1.1) Simplify:

a) $(−2)3+4×(−3)(-2)^3 + 4 \times (-3)(−2)3+4×(−3) =$

_____

b) $52−645^2 - \sqrt{64}52−64 =$

_____

1.2) Write in expanded form:

a) $24×322^4 \times 3^224×32 =$

_____

1.3) Arrange in ascending order:
$−3,5,−1,0,−7$-3, 5, -1, 0, -7$−3,5,−1,0,−7$
Answer:
_____

1.4) Write down the square root of 121 and the cube of 3.
$\sqrt{121} =$ _____ $3^3 =$ _____

Question 2: Graph Interpretation (10 Marks)

Use the table below to answer the questions.

📊 **Table : Favourite Fruits of Grade 8 Learners**

Fruit	Number of Learners
Apples	████████ (8)
Bananas	███████ (7)
Oranges	██████████ (10)
Grapes	██████ (6)
Mangoes	█████████ (9)

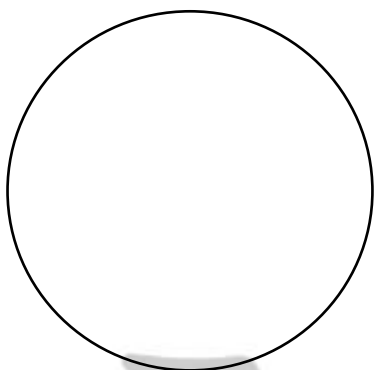2.1) Which fruit is the most popular?

_____

2.2) How many learners were surveyed in total?

_____

2.3) Difference between mango and grape preferences:

_____

2.4) Represent the data in the pie chart below. Divide and label correctly. (Use your protractor.)

Question 3: Number Patterns (15 Marks)

3.1) Complete the pattern:
12, 24, 48, , , ____

_____

3.2) Describe the rule:

_____

3.3) General term (Tn) for: 4, 7, 10, 13...
Tn =

_____

3.4) Find the 15th term:

_____

3.5) Pattern: 2, 3, 5, 9, , ____
Next two terms:

_____

3.6) Type of pattern and reason:

_____
_____

SECTION B: ALGEBRA & EQUATIONS (35 MARKS)

Question 4: Simplifying Expressions (10 Marks)

4.1) $5x+3-2x+7$ =

_____

4.2) $2(3a-4)+a$ =

_____

4.3) $6(x-1)-3(x+2)$ =

_____

4.4) Factorise: $3x+6$ =

_____

Question 5: Solving Equations (10 Marks)

5.1) $4x-7=13$
x =

_____

5.2) $3(x+2)=21$
x =

_____

5.3) $5x-3=3x+5$
x =

_____

5.4) $2(x-1)+3=x+5$
x =

_____

Question 6: Word Problem (15 Marks)

A garden's length is 4 m more than its width. Its area is 60 m².

6.1) Let width = x. Length =

_____

6.2) Write area equation:

_____

6.3) Solve for xxx:

_____
_____

6.4) Find the length:

_____

6.5) State the garden dimensions:

_____

6.6) Check your answer (area = 60 m²):

_____

SECTION C: GEOMETRY & MEASUREMENT (30 MARKS)

Question 7: Angles (10 Marks)

Use the diagram below:

(Imagine lines AB and CD intersect at point E)

- ∠A = 40°
- ∠B = ?
- ∠C = adjacent to A
- ∠D = adjacent to B

7.1) ∠B =

_____

7.2) Relationship between ∠A and ∠B:

_____

7.3) If ∠C is supplementary to ∠A, find ∠C:

_____

7.4) Why is ∠D = ∠C?

_____

7.5) Total sum of angles around the point:

_____

Question 8: Area & Perimeter (10 Marks)

8.1) A circle has radius 5 cm.
Area =

_____

Perimeter =

_____

8.2) Rectangle (length = 12 cm, width = 8 cm):
Area =

_____

Perimeter =

_____

Draw and label:

_____

Question 9: Surface Area (10 Marks)

Prism Dimensions:

- Length = 10 cm
- Width = 6 cm
- Height = 4 cm

9.1) Surface Area =
SA = 2(lw + lh + wh) =

_____
_____

9.2) Volume = l × w × h =

_____

TOTAL : 100 MARKS

MEMO

SECTION A: NUMBER, OPERATIONS AND GRAPHS (35 MARKS)

Question 1: Integers and Exponents (10 Marks)

1.1)
a) $(-2)3+4\times(-3)=-8+(-12)=-20(-2)^3 + 4 \times (-3) = -8 + (-12) = -20(-2)3+4\times(-3)=-8+(-12)=-20$ ✅ (2)
b) $52-64=25-8=175^2 - \sqrt{64} = 25 - 8 = 1752-64=25-8=17$ ✅ (2)

1.2)
a) $24\times32=16\times9=1442^4 \times 3^2 = 16 \times 9 = 14424\times32=16\times9=144$ ✅ (2)

1.3) Ascending order: $-7,-3,-1,0,5$-7, -3, -1, 0, 5$-7,-3,-1,0,5$ ✅ (2)

1.4) $\sqrt{121} = 11$, $3^3 = 27$ ✅ (2)

Question 2: Graph Interpretation (10 Marks)

2.1) Oranges ✅ (1)
2.2) Total learners = 8 + 7 + 10 + 6 + 9 = **40** ✅ (2)
2.3) 9 - 6 = **3** learners ✅ (1)
2.4) Pie chart correctly divided and labeled:

- Apples: 8/40 = 20%
- Bananas: 7/40 = 17.5%
- Oranges: 10/40 = 25%
- Grapes: 6/40 = 15%
- Mangoes: 9/40 = 22.5% ✅ (6: 1 for each correct division & label)

Question 3: Number Patterns (15 Marks)

3.1) 96, 192, 384 ✅ (3)
3.2) Rule: Multiply by 2 ✅ (2)
3.3) $T_n = 3n + 1$ ✅ (3)
3.4) $T_{15} = 3(15) + 1 = 46$ ✅ (2)
3.5) Next: 17, 33
    $2 \rightarrow 3$ ($\times2-1$), $3 \rightarrow 5$ ($\times2-1$), $5 \rightarrow 9$ ($\times2-1$), etc. ✅ (2)
3.6) Not arithmetic – difference changes, rule involves $\times2-1$ ✅ (3)

SECTION B: ALGEBRA & EQUATIONS (35 MARKS)

Question 4: Simplifying Expressions (10 Marks)

4.1) $5x+3-2x+7=3x+10$ $5x + 3 - 2x + 7 = 3x + 10$ $5x+3-2x+7=3x+10$ ✅ (2)

4.2) $2(3a-4)+a=6a-8+a=7a-8$ $2(3a - 4) + a = 6a - 8 + a = 7a - 8$ $2(3a-4)+a=6a-8+a=7a-8$ ✅ (3)

4.3) $6(x-1)-3(x+2)=6x-6-3x-6=3x-12$ $6(x - 1) - 3(x + 2) = 6x - 6 - 3x - 6 = 3x - 12$ $6(x-1)-3(x+2)=6x-6-3x-6=3x-12$ ✅ (3)

4.4) $3x+6=3(x+2)$ $3x + 6 = 3(x + 2)$ $3x+6=3(x+2)$ ✅ (2)

Question 5: Solving Equations (10 Marks)

5.1) $4x-7=13 \Rightarrow 4x=20 \Rightarrow x=5$ $4x - 7 = 13 \setminus 4x = 20 \setminus x = 5$ $4x-7=13 \Rightarrow 4x=20 \Rightarrow x=5$ ✅ (2)

5.2) $3(x+2)=21 \Rightarrow x+2=7 \Rightarrow x=5$ $3(x + 2) = 21 \setminus x + 2 = 7 \setminus x = 5$ $3(x+2)=21 \Rightarrow x+2=7 \Rightarrow x=5$ ✅ (2)

5.3) $5x-3=3x+5 \Rightarrow 2x=8 \Rightarrow x=4$ $5x - 3 = 3x + 5 \setminus 2x = 8 \setminus x = 4$ $5x-3=3x+5 \Rightarrow 2x=8 \Rightarrow x=4$ ✅ (3)

5.4) $2(x-1)+3=x+5 \Rightarrow 2x-2+3=x+5 \Rightarrow 2x+1=x+5 \Rightarrow x=4$ $2(x - 1) + 3 = x + 5 \setminus 2x - 2 + 3 = x + 5 \setminus 2x + 1 = x + 5 \setminus x = 4$ $2(x-1)+3=x+5 \Rightarrow 2x-2+3=x+5 \Rightarrow 2x+1=x+5 \Rightarrow x=4$ ✅ (3)

Question 6: Word Problem (15 Marks)

6.1) Length = $x+4$ $x + 4$ ✅ (2)

6.2) Area = $x(x+4)=60$ $x(x + 4) = 60$ $x(x+4)=60$ ✅ (2)

6.3) $x^2+4x-60=0 \Rightarrow (x+10)(x-6)=0 \Rightarrow x=6$ $x^2 + 4x - 60 = 0 \setminus (x + 10)(x - 6) = 0 \setminus x = 6$ $x^2+4x-60=0 \Rightarrow (x+10)(x-6)=0 \Rightarrow x=6$ (since width can't be negative) ✅ (5)

6.4) Length = $6 + 4 = 10$ ✅ (2)

6.5) Width = 6 m, Length = 10 m ✅ (2)

6.6) Area check: $6 \times 10 = 60$ m² ✅ (2)

SECTION C: GEOMETRY & MEASUREMENT (30 MARKS)

Question 7: Angles (10 Marks)

7.1) ∠B = 40° ✅ (1)

7.2) Vertically opposite angles ✅ (1)

7.3) ∠C = 180 - 40 = 140° ✅ (2)

7.4) ∠D = ∠C because they're vertically opposite ✅ (2)

7.5) 4 angles: 40° + 40° + 140° + 140° = 360° ✅ (4)

Question 8: Area & Perimeter (10 Marks)

8.1)

- Area = $\pi r^2 = 3.14 \times 25 = 78.5 \, \text{cm}^2$ ✅ (3)
- Perimeter = $2\pi r = 2 \times 3.14 \times 5 = 31.4 \, \text{cm}$ ✅ (2)

8.2)

- Area = $12 \times 8 = 96 \, \text{cm}^2$ ✅ (2)
- Perimeter = $2(12 + 8) = 2(20) = 40 \, \text{cm}$ ✅ (2)
- Drawing: Neat rectangle with sides labelled ✅ (1)

Question 9: Surface Area & Volume (10 Marks)

9.1)

- SA = 2(lw + lh + wh) = 2(60 + 40 + 24) = 2(124) = 248 cm² ✅ (6)

9.2)

- Volume = $10 \times 6 \times 4 = 240 \, \text{cm}^3$ ✅ (4)

✅ **TOTAL = 100 MARKS**