

SMARTWIZ

GRADE 8 MATHEMATICS EXAM

MARKS: 100

MARKS	

TIME: 1 hour

SCHOOL _____

CLASS (e.g. 4A) _____

SURNAME _____

NAME _____

MYST PATHWORKS

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 PATTERNS (40 MARKS)

Question 1: Operations with Integers (10 Marks)

Calculate the following:

a) $-8+15=-8 + 15 =-8+15=$

b) $12-(-7)=12 - (-7) =12-(-7)=$

c) $(-5)\times(-3)=(-5) \times (-3) =(-5)\times(-3)=$

d) $-36\div 6=-36 \div 6 =-36\div 6=$

e) Simplify: $(-4)^2-3\times(-2)(-4)^2 - 3 \times (-2)(-4)^2-3\times(-2)$

Question 2: Number Patterns (10 Marks)

2.1) Find the next three terms in the sequence:

3, 6, 12, 24, ____, ____, ____

2.2) Write down the rule for the pattern above.

2.3) Find the 10th term of the sequence.

Question 3: Squares and Square Roots (10 Marks)

3.1) Find the value of:

a) $81=\sqrt{81} =81=$

b) $144=\sqrt{144} =144=$

3.2) Calculate:

a) $152=15^2=152=$

b) $0.52=0.5^2=0.52=$

3.3) Find two consecutive whole numbers between which $50\sqrt{50}$ lies.

Question 4: Factors and Multiples (10 Marks)

4.1) Find the prime factors of 60.

4.2) Find the Highest Common Factor (HCF) of 24 and 36.

4.3) Find the Lowest Common Multiple (LCM) of 8 and 12.

SECTION B: ALGEBRA (30 MARKS)

Question 5: Simplifying Expressions (10 Marks)

Simplify each of the following:

a) $3x+5x-2x=3x + 5x - 2x =3x+5x-2x=$

b) $7a-3+2a+8=7a - 3 + 2a + 8 =7a-3+2a+8=$

c) $4(m+3)-2(m-1)=4(m + 3) - 2(m - 1) =4(m+3)-2(m-1)=$

Question 6: Solving Equations (10 Marks)

Solve for xxx:

a) $2x+5=172x + 5 = 172x+5=17$

b) $3(x-2)=12$ $3(x-2)=12$ $3(x-2)=12$

c) $4x-3=2x+9$ $4x-3=2x+9$ $4x-3=2x+9$

Question 7: Word Problem (10 Marks)

A rectangle has a length that is 3 meters longer than twice its width. If the perimeter of the rectangle is 42 meters, find the length and the width.

Show all working steps.

SECTION C: GEOMETRY (30 MARKS)

Question 8: Angles (10 Marks)

8.1) Find the missing angle x in a triangle where the other two angles are 50° and 70° .

8.2) Two angles are supplementary. One angle is 30° more than the other. Find the two angles.

Question 9: Properties of Quadrilaterals (10 Marks)

9.1) Name a quadrilateral with:

a) All sides equal and all angles right angles.

b) Only one pair of parallel sides.

9.2) Draw a parallelogram and label its properties (no marks for neatness)

Question 10: (10 Marks)



10.1) Calculate the perimeter of a square with side length 8 cm.

10.2) Find the area of a triangle with base 10 cm and height 6 cm.

10.3) Find the area of a circle with radius 7 cm. Use $\pi=3.14$ $\pi=3.14$.

TOTAL : 100



MEMO

SECTION A: NUMBER OPERATIONS AND PATTERNS (40 MARKS)

Question 1: Operations with Integers (10 Marks)

a) $-8+15=7-8+15=7-8+15=7$ (1 mark)

b) $12-(-7)=12+7=19$ $12-(-7)=12+7=19$ (1 mark)

c) $(-5)\times(-3)=15$ $(-5)\times(-3)=15$ (1 mark)

d) $-36\div6=-6$ $-36\div6=-6$ (1 mark)

e) $(-4)^2-3\times(-2)=16+6=22$ $(-4)^2-3\times(-2)=16+6=22$ (2 marks: 1 for square, 1 for multiplication and final answer)

Question 2: Number Patterns (10 Marks)

2.1) Next three terms: 48, 96, 192 (3 marks)

2.2) Rule: Multiply previous term by 2 (2 marks)

2.3) 10th term: $3\times29=87$ $3\times29=87$ (5 marks)

Question 3: Squares and Square Roots (10 Marks)

3.1)

a) $81=9^2$ $81=9^2$ (1 mark)

b) $144=12^2$ $144=12^2$ (1 mark)

3.2)

a) $15^2=225$ $15^2=225$ (1 mark)

b) $0.5^2=0.25$ $0.5^2=0.25$ (1 mark)

3.3) 50 lies between 7 and 8 because $7^2=49$ and $8^2=64$ (4 marks)

Question 4: Factors and Multiples (10 Marks)

4.1) Prime factors of 60: $2\times2\times3\times5$ or $2^2\times3\times5$ (4 marks)

4.2) HCF of 24 and 36: 12 (3 marks)

4.3) LCM of 8 and 12: 24 (3 marks)

SECTION B: ALGEBRA (30 MARKS)

Question 5: Simplifying Expressions (10 Marks)

a) $3x+5x-2x=(3+5-2)x=6x$ $3x + 5x - 2x = (3 + 5 - 2)x = 6x$ (3 marks)

b) $7a-3+2a+8=(7a+2a)+(-3+8)=9a+5$ $7a - 3 + 2a + 8 = (7a + 2a) + (-3 + 8) = 9a + 5$ (3 marks)

c) $4(m+3)-2(m-1)=4m+12-2m+2=(4m-2m)+(12+2)=2m+14$ $4(m + 3) - 2(m - 1) = 4m + 12 - 2m + 2 = (4m - 2m) + (12 + 2) = 2m + 14$ (4 marks)

Question 6: Solving Equations (10 Marks)

a) $2x+5=17 \Rightarrow 2x=12 \Rightarrow x=6$ $2x + 5 = 17 \Rightarrow 2x = 12 \Rightarrow x = 6$ (3 marks)

b) $3(x-2)=12 \Rightarrow 3x-6=12 \Rightarrow 3x=18 \Rightarrow x=6$ $3(x - 2) = 12 \Rightarrow 3x - 6 = 12 \Rightarrow 3x = 18 \Rightarrow x = 6$ (3 marks)

c) $4x-3=2x+9 \Rightarrow 4x-2x=9+3 \Rightarrow 2x=12 \Rightarrow x=6$ $4x - 3 = 2x + 9 \Rightarrow 4x - 2x = 9 + 3 \Rightarrow 2x = 12 \Rightarrow x = 6$ (4 marks)

Question 7: Word Problem (10 Marks)

Let width = w , length = l . Given:

$$l=2w+3$$

$$\text{Perimeter } P=2(l+w)=2(2w+3+w)=42$$

Step 1: $2((2w+3)+w)=42$ $2((2w + 3) + w) = 42$ (2 marks)

Step 2: $2(3w+3)=42 \Rightarrow 6w+6=42$ $2(3w + 3) = 42 \Rightarrow 6w + 6 = 42$ (2 marks)

Step 3: $6w=36 \Rightarrow w=6$ $6w = 36 \Rightarrow w = 6$ (2 marks)

Step 4: $l=2(6)+3=15$ $l = 2(6) + 3 = 15$ (2 marks)

Answer: Width = 6 m, Length = 15 m (2 marks)

SECTION C: GEOMETRY (30 MARKS)

Question 8: Angles (10 Marks)

8.1) Sum of angles in triangle = 180°

$$x = 180 - (50 + 70) = 60^\circ \quad x = 180 - (50 + 70) = 60^\circ \quad x = 180 - (50 + 70) = 60^\circ \quad (5 \text{ marks})$$

8.2) Let angles be x and $x + 30$, and supplementary means sum = 180:

$$x + (x + 30) = 180 \Rightarrow 2x + 30 = 180 \Rightarrow 2x = 150 \Rightarrow x = 75 \quad x + (x + 30) = 180 \Rightarrow 2x + 30 = 180 \Rightarrow 2x = 150 \Rightarrow x = 75$$

$$= 150 \Rightarrow x = 75 \quad x + (x + 30) = 180 \Rightarrow 2x + 30 = 180 \Rightarrow 2x = 150 \Rightarrow x = 75$$

Angles: 75° and 105° (5 marks)

Question 9: Properties of Quadrilaterals (10 Marks)

9.1a) Square (2 marks)

9.1b) Trapezium (2 marks)

9.2) Parallelogram properties (6 marks):

- Opposite sides parallel and equal
- Opposite angles equal
- Diagonals bisect each other

Question 10: Perimeter and Area (10 Marks)

10.1) Perimeter square = $4 \times 8 = 32 \text{ cm}$ (3 marks)

10.2) Area triangle = $\frac{1}{2} \times 10 \times 6 = 30 \text{ cm}^2$ (3 marks)

10.3) Area circle = $\pi r^2 = 3.14 \times 7^2 = 3.14 \times 49 = 153.86 \text{ cm}^2$ (4 marks)

TOTAL: 100 MARKS