

GRADE 8 JUNE EXAMINATION 2016**MATHEMATICS**

NAME: _____

SURNAME: _____

CLASS:8 _____

MARKING GRID

Question Number	1	2	3	4	5	6	7	8	9	10	Total
Total Marks per Question	10	18	8	6	7	15	5	7	16	8	100
Learner's Marks											

Subject Educator's signature: _____

Read the following instructions carefully before answering the questions.

- 1 This question paper consists of 10 questions and 12 pages.
- 2 Answer ALL the questions in the spaces provided.
- 3 Diagrams are not drawn to scale
- 4 Clearly show ALL calculations where necessary
- 5 Answers only will not necessarily be awarded full marks.
- 6 You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
- 7 If necessary, round off answers to TWO decimal places, unless stated otherwise.
- 8 Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Write down the following :

1.1.1 The first 4 multiples of 3 (1)

1.1.2 Two factors of 30 which add up to 13 (1)

1.1.3 The cube root of 27 (1)

1.1.4 The Additive inverse of -4 (1)

1.1.5 The answer to $-3 + (5) \times 4$ (1)

1.2 Complete the following geometrical statements:

1.2.1 The supplement of 75° is (1)

1.2.2 A triangle with two equal sides is called (1)

1.2.3 An angle of 360° is called a (1)

1.2.4 The lines that are equidistant from each other are called.....lines. (1)

1.2.5 The opposite angles of a rhombus are (1)

[10]

SECTION B

QUESTION 2

2.1 Answer the following:

- 2.1.1 Write 72 as a product of its prime factors. Write your answer in exponential form. (3)

- 2.1.2 Determine the LCM of 24 and 32 (3)

- 2.1.3 Write 345 000 000 in scientific notation. (2)

2.2 Simplify: Show all your workings

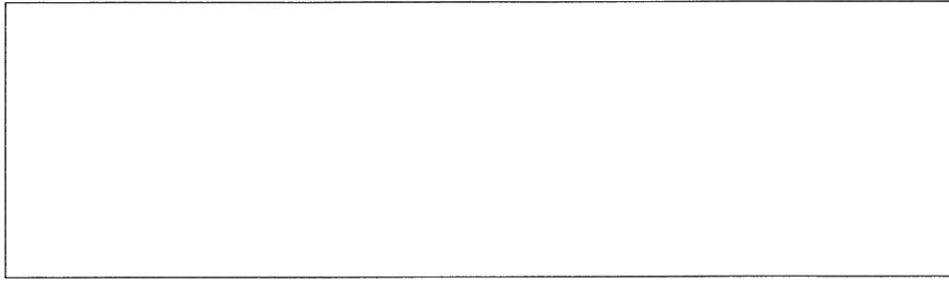
- 2.2.1 $(\sqrt[3]{8})^3$ (2)

- 2.2.2 $\sqrt{16 + 9}$ (2)

- 2.2.3 $3^4 + (17)^0 - \sqrt{49}$ (3)

2.2.4 $(-1)^3 + 10^2 + 4 \times -5$

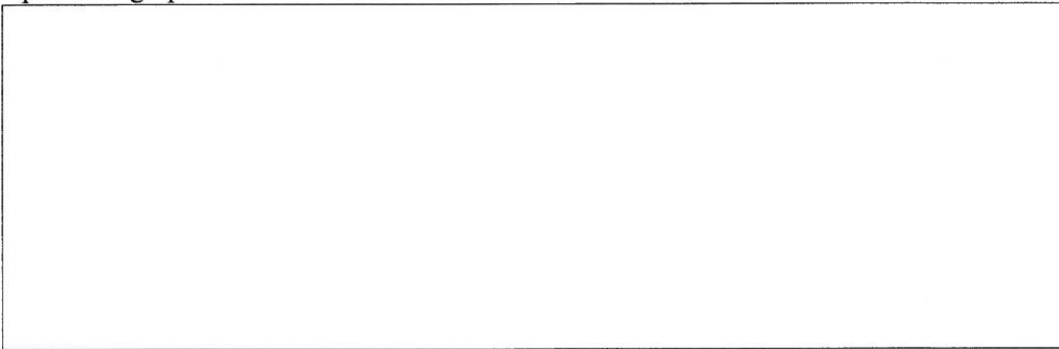
(3)



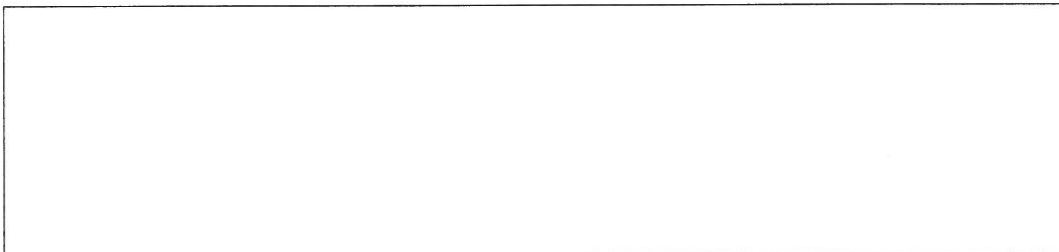
[18]

QUESTION 3

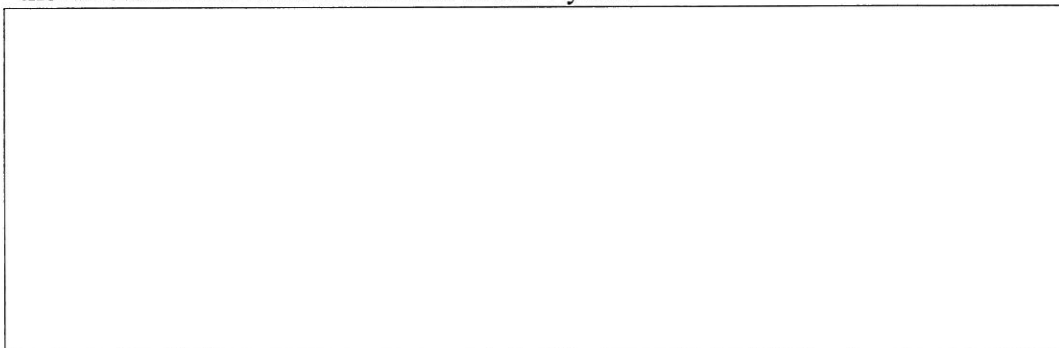
- 3.1 Tarra bought a fridge for R2 500 and sold it for R3 999. Calculate the percentage profit he made. (3)



- 3.2 Ivy bought the fridge for R7 999 and paid a deposit of 10%. How much was the Deposit? (2)



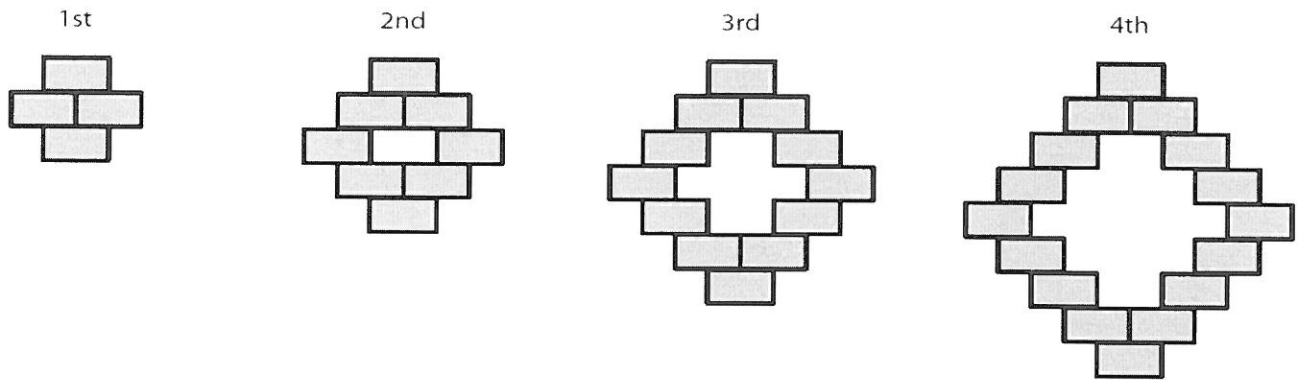
- 3.3 R5 000 is invested at 6 % simple interest per year for 4 years. Calculate what the investment is worth at the end of the 4 years. (3)



[8]

QUESTION 4

4.1 The following are the first four diagrams in a pattern:



Pattern No.	1	2	3	4	.....	6	.....	4.1.3	.....	n
No. of Shaded Blocks	4	8	12	16	.....	4.1.1	.....	276	.....	4.1.2

4.1.1 How many shaded blocks would there be in the 6th diagram? (2)

4.1.2 Determine the rule for finding the general term(T_n) (2)

4.1.3 Which diagram in the sequence will have 276 blocks? (2)

[6]

QUESTION 5

5.1 Consider the following expression: $-10x^3 + 6x + 12 - 3x^2$

5.1.1 How many terms are there? (1)

5.1.2 What is the constant term? (2)

5.1.3 What is the coefficient of x^2 ? (1)

5.1.4 Calculate the value of the expression if $x = -2$ (2)

5.2 Eddie is x years old. Write an expression in x to show how old he will be in 11 years. (1)

[7]

QUESTION 6

6.1 Simplify and Show all your workings:

6.1.1 $(3a - 2b) - 3b$ (2)

6.1.2 $\frac{2}{3}(9x - 12)$ (2)

6.1.3 $2a(a - 3) - (a - 5)$ (4)

6.1.4 $(-2p^5)^3$ (2)

6.1.5 $\frac{36p^6}{-6p^2}$ (2)

6.2 Subtract $3a - 2b + 1$ from $4a - 5b - 2$ (3)

[15]

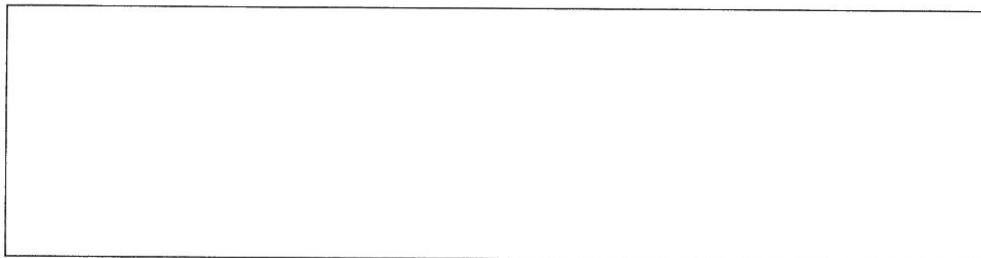
QUESTION 7

7.1 Solve for x :

7.1.1 $2x - 5 = 11$ (2)

7.1.2 $4(x - 2) - 3x = 2x - 5$

(3)

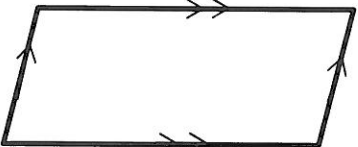
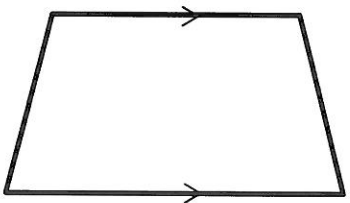
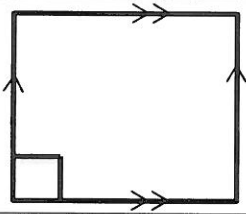


[5]

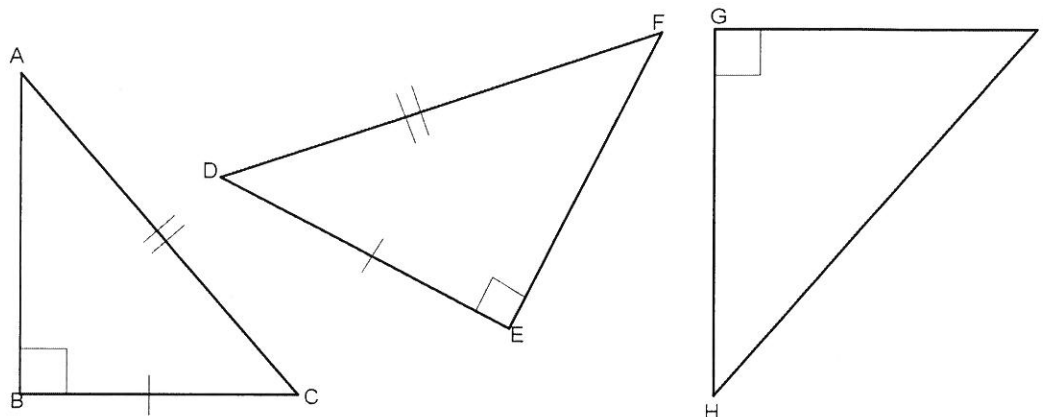
SECTION C

QUESTION 8

- 8.1 Write down the name of the 2D shape from column A and **ONE** characteristic from column B of that 2D shape.

	Column A 2D shape	Column B Characteristics	
8.1.1		All angles are equal to 90^0	(1)
8.1.1 Answer			
8.1.2		Two pairs of opposite sides are parallel	(1)
8.1.2 Answer			
8.1.3		One pair of opposite sides are parallel	(1)
8.1.3 Answer			

8.2 Consider the triangles below. Give reason for every statement.



8.2.1 Is $\triangle ABC$ and $\triangle DEF$ similar, congruent or neither? Give a reason. (2)

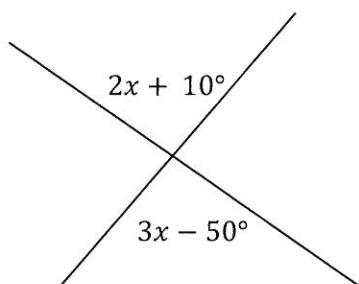
8.2.2 Is $\triangle ABC$ and $\triangle IHG$ similar, congruent or neither? Give a reason. (2)

[7]

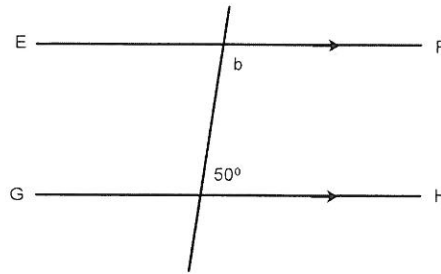
QUESTION 9

9.1 Determine the value of the variables in the diagrams. Give reasons for every statement you make.

9.1.1

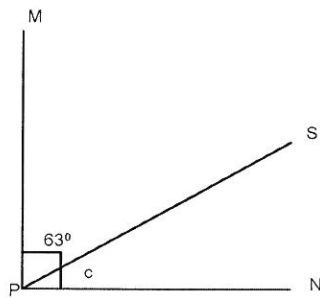


(3)

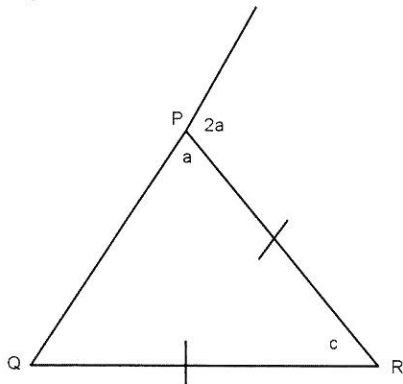


9.1.3

(3)

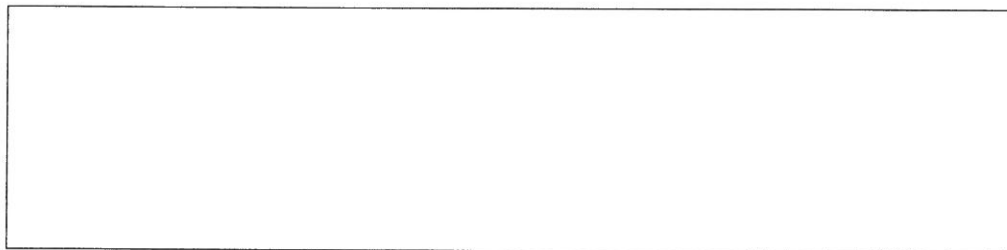


9.2 Consider the figure below and answer the following questions. Give reason for every statement you make.



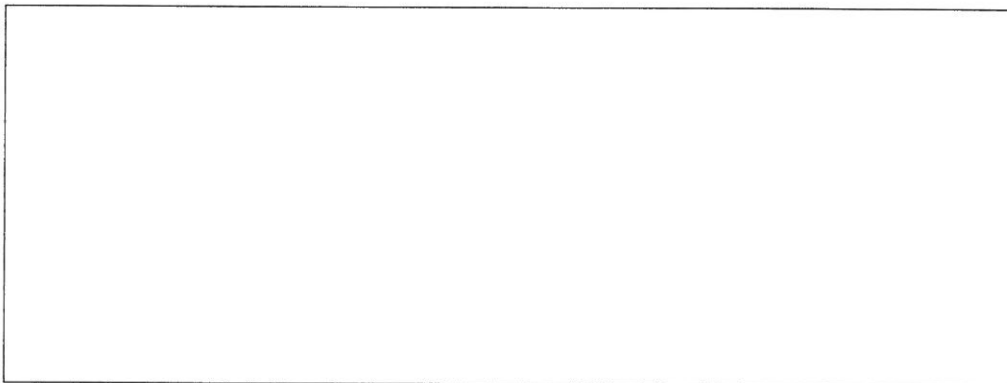
9.2.1 Determine the value of a

(3)



9.2.2 Determine the value of c

(4)

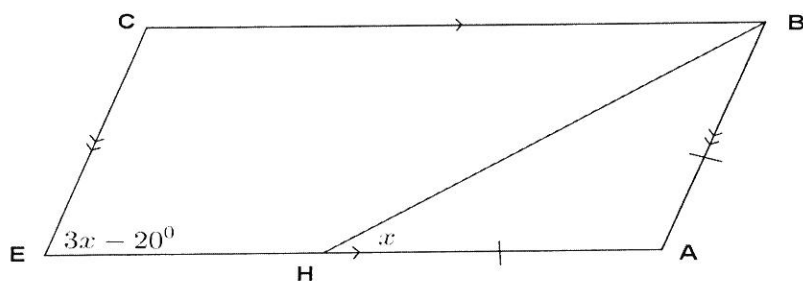


[16]

QUESTION 10

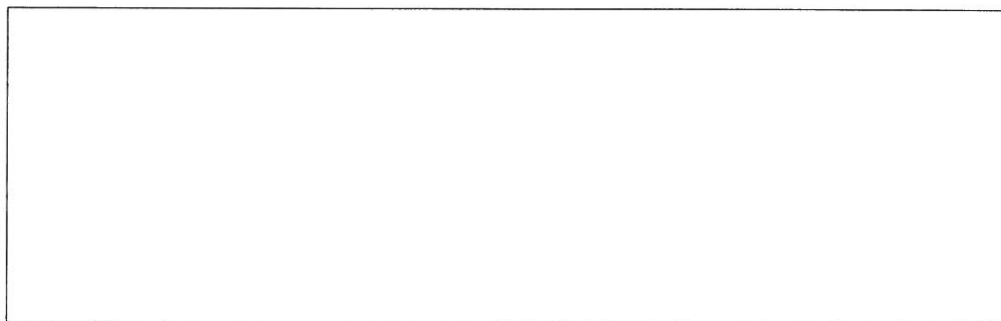
10.1

In the figure, ABCE is a parallelogram. Also, $AB = AH$, $\hat{AHB} = x$ and $\hat{E} = 3x - 20^\circ$.
Answer the following, and provide reasons in each case.



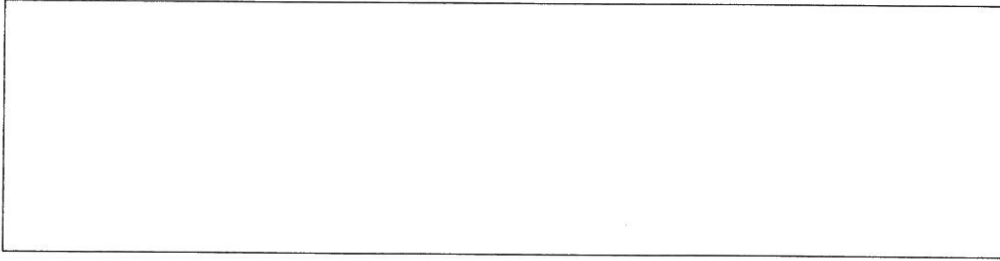
10.1.1 Find two other angles that are also equal to x .

(4)



10.1.2 Calculate the size of x .

(4)



[8]

QUESTION 1

Question No.	Suggested Answer	Descriptors
1.1.1	3;6;9;12✓	1 Mark for all correct multiples of three
1.1.2	$F_{30} \rightarrow 1;2;3;5;6;10;15;30$ 3 & 10✓	1 Mark for final answer
1.1.3	3✓	
1.1.4	4✓	
1.1.5	$= -3+5 \times 4$ $= -3+20$ $= 17✓$	1 Mark for final answer
1.2.1	$180^0 - 75^0$ $105^0✓$	1 Mark for final answer
1.2.2	Isosceles $\Delta✓$	
1.2.3	Angle of Revolution or Rotation✓	
1.2.4	Parallel ✓	
1.2.5	Equal ✓	
		[10]

QUESTION 2

Question No.	Suggested Answer	Descriptors												
2.1.1	<table><tr><td>2</td><td>72</td></tr><tr><td>2</td><td>36</td></tr><tr><td>2</td><td>18</td></tr><tr><td>3</td><td>9</td></tr><tr><td>3</td><td>3</td></tr><tr><td></td><td>1</td></tr></table> <div>✓</div>	2	72	2	36	2	18	3	9	3	3		1	1 Mark for prime factors
2	72													
2	36													
2	18													
3	9													
3	3													
	1													
	$2 \times 2 \times 2 \times 3 \times 3 \checkmark$	1 Mark for multiplying prime factors												
	$= 2^3 \times 3^2 \checkmark$	1 mark for expressing prime factors in exponential form Answer only full marks $\frac{3}{3}$.												
2.1.2	$M_{24}=24; 48; 72; 96; \dots \checkmark$ $M_{32}=32; 64; 96; \dots \checkmark$ LCM= 96 ✓ <div>OR</div> Any other method	1 Mark for multiples of 24 1 Mark for multiples of 32 1 Mark for LCM Answer only full marks $\frac{3}{3}$.												
2.1.3	$3.45 \checkmark \times 10^8 \checkmark$	1 Mark for 3.45 1 Mark for 10^8												

2.2.1	$= 2^3 \checkmark$ $= 8 \checkmark$	1 mark for exponential form 1 mark for answer Answer only full marks $\frac{2}{2}$
2.2.2	$= \sqrt{25} \checkmark$ $= 5 \checkmark$	1 Mark for $\sqrt{25}$ 1 Mark for answer Answer only full marks $\frac{2}{2}$.
2.2.3	$= 81 \checkmark + 1 \checkmark - 7$ $= 75 \checkmark$	1 Mark for 81 1 mark for 1 1 mark for answer Answer only full marks $\frac{3}{3}$.
2.2.4	$= -1 \checkmark + 100 \checkmark + 4 \times -5$ $= 99 - 20$ $= 79 \checkmark$	1 Mark for simplifying exponents 1 Mark for method 1 Mark for 79 Answer only full marks $\frac{3}{3}$. [18]

QUESTION 3

Question No.	Suggested Answer	Descriptors
3.1	$= 3\,999 - 2\,500$ $= 1\,499 \checkmark$ $= \frac{1\,499}{2\,500} \times 100 \checkmark$ $= \frac{1\,499}{25}$ $= 59,99\% \text{ OR } 60\% \checkmark$ <p style="text-align: center;">OR Any other method</p>	1 Mark for 1 499 1 Mark for method 1 mark for answer
3.2	$\frac{10}{100} \times 7\,999 \checkmark$ $= R799,90 \checkmark$	1 mark for method 1 mark for answer
3.3	$SI = \frac{5\,000 \times 6 \times 4}{100}$ $= 1\,200 \checkmark$ Investment value = $5\,000 + 1\,200 \checkmark$ $= 6\,200 \checkmark$ <p style="text-align: center;">OR Any other method</p>	1 Mark for interest 1 Mark for method 1 Mark for answer.
		[8]

QUESTION 4

Question No.	Suggested Answer	Descriptors
4.1.1	24✓✓	
4.1.2	$T_n = 4 \times n + \square$ $T_1 = 4 \times 1 + 0 = 4$ $T_n = 4 \times n + \square$ $T_2 = 4 \times 2 + 0 = 8$ $\therefore T_n = 4n + 0$ ✓ $T_n = 4n$ ✓	1 mark for method 1 Mark for answer Answer only full mark $\frac{2}{2}$ *If the rule is written in words full marks $\frac{2}{2}$
4.1.3	$T_n = 4n$ $276 = 4n$ $\frac{276}{4} = n$ ✓ $\therefore n = 69$ ✓	1 mark for method 1 Mark for answer Answer only full mark $\frac{2}{2}$ [6]

QUESTION 5

Question No.	Suggested Answer	Descriptors
5.1.1	4 ✓	
5.1.2	12 ✓	
5.1.3	-3 ✓	
5.1.4	$= -10(-2)^3 + 6(-2) + 12 - 3(-2)^2$ ✓ $= 80 - 12 + 12 - 12$ $= 68$ ✓	1 Mark for substitution 1 Mark for answer Answer only full mark $\frac{2}{2}$
5.2	$x + 11$ ✓	1 Mark for answer [7]

QUESTION 6

Question No.	Suggested Answer	Descriptors
6.1.1	$3x$ ✓ - $5b$ ✓	1 Mark for $3x$ 1 Mark for $-5b$
6.1.2	$6x$ ✓ - 8 ✓	1 Mark for $6x$ 1 Mark for -8
6.1.3	$2a^2 - 6a$ ✓ - $a + 5$ ✓✓ $= 2a^2 - 7a + 5$ ✓	1Mark for method 1 Mark for $2a^2 - 6a$ 1 Mark for $-a + 5$

6.1.4	$-8^{\checkmark}p^8^{\checkmark}$	1 Mark for -8 1 Mark for p^8
6.1.5	$-6^{\checkmark}p^4^{\checkmark}$	1 Mark for -6 1 Mark for p^4
6.2	$= 4a - 5b - 2 - (3a - 2b + 1)^{\checkmark}$ $= 4a - 5b - 2 - 3a + 2b - 1^{\checkmark}$ $= a - 3b - 3^{\checkmark}$	1 Mark for subtracting a correct expression. 1 Mark for $-3a + 2b - 1$ 1 Mark for answer
[15]		

QUESTION 7

Question No.	Suggested Answer	Descriptors
7.1.1	$2x = 16^{\checkmark}$ $x = 4^{\checkmark}$	1 Mark for method 1 Mark for answer
7.1.2	$4x - 8 - 3x = 2x - 5^{\checkmark}$ $x - 2x = -5 + 8^{\checkmark}$ $\therefore x = -3^{\checkmark}$	1 Mark for $4x - 8$ 1 Mark for method 1 Mark for answer
[5]		

QUESTION 8

Question No.	Suggested Answer		Descriptors
8.1.1	Parallelogram	Two pairs of opposite sides are parallel	1 mark for both answers
8.1.2	Trapezium	One pair of opposite sides are parallel	1 mark for both answers
8.1.3	Square	All angles are equal to 90^0	1 mark for both answers
8.2.1	Congruent; REASON →Corresponding sides are equal OR RHS OR $AC=DF$; $BC=DE$ & $\hat{B} = \hat{E}$		1 Mark for answer 1 Mark for reason
8.2.2	Neither; REASON →Corresponding angles and sides are not equal & sides are not proportional in length		1 Mark for answer 1 Mark for reason
[7]			

QUESTION 9

Question No.	Suggested Answer	Descriptors
9.1.1	$2x + 10^0 = 3x - 50^0 \checkmark$ (Vertical opposite angles) \checkmark $x = 60^0 \checkmark$	1 Mark for statement 1 Mark for reason 1 Mark for answer
9.1.2	$50^0 + b = 180^0 \checkmark$ (EF // GH, Co-interior angles) \checkmark $b = 130^0 \checkmark$	1 Mark for statement 1 Mark for reason 1 Mark for answer
9.1.3	$63^0 + c = 90^0 \checkmark$ (Complementary angle, $M\hat{P}N = 90^0$) \checkmark $c = 27^0 \checkmark$	1 Mark for statement 1 Mark for reason 1 Mark for answer
9.2.1	$2a + a = 180^0 \checkmark$ (Adjacent angles OR Angles on straight line) \checkmark $3a = 180^0$ $a = 60^0 \checkmark$	1 Mark for statement 1 Mark for reason 1 Mark for answer
9.2.2	$\hat{Q} = a \checkmark$ (Angles opposite equal sides) \checkmark $\therefore a + \hat{Q} + c = 180^0$ (Sum of interior angles of Δ) \checkmark $60^0 + 60^0 + c = 180^0$ $c = 180^0 - 120^0$ $c = 60^0 \checkmark$	1 Mark for statement 1 Mark for each reason(2) 1 Mark for answer
		[16]

QUESTION 10

Question No.	Suggested Answer	Descriptors
10.1.1	$x = \hat{A}BH \checkmark$ (Angles opposite equal sides) \checkmark	1 Mark for reach statement (2)
	$x = \hat{C}BH \checkmark$ (EA // CB alternating angles) \checkmark	1 Mark for each reason(2)
10.1.2	$3x - 20^0 = 2x \checkmark$ (Opposite angles of parm. ABCE are =) \checkmark $3x - 2x = 20^0 \checkmark$ $x = 20^0 \checkmark$	1 Mark for statement 1 Mark for reason 1 Mark for method 1 Mark for answer
		[8]
		Total 100

GRADE 8 MATHEMATICS

1. Format of the question paper

Paper	Types of questions	Marks	Duration	Total
	Number, operation and Relations	31	2 hours	100
	Patterns, Function and Algebra	33		
	Space and Shape (Geometry)	36		

2. Number and sequence of questions

SECTION A

Question 1 : Shot questions

Sub-question numbered 1.1 - 1.10

SECTION B

Question 2 : Whole numbers and Exponents

Sub-question numbered 2.1 - 2.2.4

Question 3 : Whole numbers (Financial Maths)

Sub-question numbered 3.1 - 3.3

Question 4 : Numeric and Geometric Patterns

Sub-question numbered 4.1.1 - 4.1.3

Question 5 : Algebraic Expressions

Sub-question numbered 5.1 - 5.2

Question 6 : Algebraic Expressions

Sub-question numbered 6.1.1 - 6.1.6

Question 7 : Algebraic Equations

Sub-question numbered 7.1.1 – 7.1.2

SECTION C

Question 8 : Classifying 2D shapes; Similarity and Congruency

Sub-question numbered 8.1 - 8.2.2

Question 9 : Geometry of straight lines and Geometry of 2D shapes

Sub-question numbered 9.1 - 9.2.2

Question 10 : Geometry of straight lines and Geometry of 2D shapes

Sub-question numbered 10.1.1 – 10.1.2

All questions are set across cognitive levels and arranged from lower to higher cognitive levels.

3. Cognitive demands of the papers

The question paper includes questions across all cognitive levels as outlined in the CAPS documents

The cognitive levels are in accordance with the taxonomies as derived by Bloom and Barrett.

3.1 Weighting of cognitive levels

Cognitive levels	Description	%Paper 1
1	Knowledge	26%
2	Routine procedure	43%
3	Complex procedure	21%
4	Problem solving	10%

3.2 Weighting of prescribed content

Paper	Types of questions	Marks	Duration	Total
1	Number, operation and Relations	31	2 hours	100
	Patterns, Function and Algebra	33		
	Space and Shape (Geometry)	36		

MATHEMATICS : 2016			GRADE : 8			
TYPES OF TASK ANALYSIS			EXAMINATION			
DATE			Jun-16			
Questions & Topics			Cognitive levels			
Questions	Topics	Total	Knowledge	Routine	Complex	Problem solving
1	Short Questions (Variety of Topics)	10				
1.1.1			1			
1.1.2				1		
1.1.3			1			
1.1.4			1			
1.1.5			1			
1.2.1				1		
1.2.2			1			
1.2.3			1			
1.2.4			1			
1.2.5			1			
2	Whole numbers	18				
2.1.1					3	
2.1.2				3		
2.1.3				2		
2.2.1				2		
2.2.2				2		
2.2.3				3		
2.2.4					3	
3	Financial Mathematics	8				
3.1					3	
3.2				2		
3.3				3		
4	Numeric and Geometric Patterns	6				
4.1.1				2		
4.1.2					2	
4.1.3					2	
5	Algebraic Expressions	7				
5.1.1			1			
5.1.2			2			
5.1.3			1			
5.1.4				2		
5.2						1

6	Algebraic Expressions	15				
6.1.1			2			
6.1.2				2		
6.1.3				4		
6.1.4				2		
6.1.5				2		
6.1.6					3	
7	Algebraic Equations	5				
7.1.1			2			
7.1.2				3		
8	Classifying 2D shapes; Similarity and Congruency	7				
8.1.1			1			
8.1.2			1			
8.2.3			1			
8.2.1			2			
8.2.2			2			
9	Geometry of straight lines and Geometry of 2D shapes	16				
9.1.1				3		
9.1.2				3		
9.1.3				3		
9.2.1					3	
9.2.2						4
10	Geometry of straight lines and Geometry of 2D shapes	8				
10.1.1						4
10.1.2					4	
TOTAL MARKS		100	23	45	23	9
TOTAL PERCENTAGE		100				

4. General information

- Learners will have answer in the space provided.
- Adhere to examination instructions.
- Ensure that learners answer all the questions.

5. Marking guidelines

- Marks are only awarded for a correct answer. Therefore, no half-mark should be awarded. e.g (full mark)
- No marks will be awarded for incorrect answers.
- Refer to the memorandum for marking.
- Continues accuracy apply