Mathematics Strategy – 2017/2019

Grade 9 Revision Exemplar Papers

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

SCI-BONO DISCOVERY CENTRE

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

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Grade 9 Examination Exemplar 1

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

INSTRUCTIONS (2014)

1. This Question Paper has two sections, Section A and Section B.

2. **SECTION A** has ten multiple questions. Answer this section on the answer sheet provided. Four possible answers are given. Circle the letter next to the correct answer.

3. **SECTION B** has 6 Questions. Answer ALL Questions.

4. A non-programmable calculator may be used unless otherwise stated.

5. Show ALL your work. (**SECTION B**)

6. Answer sheets for Questions 1; 6.1; 9.1, and 9.2.1 are provided. (**See the Annexure A, B and C). These sheets must be handed in with your answer book.**

SECTION A

This section has 10 multiple choice questions. Four possible answers are given. Circle the letter (A - D) next to the correct answer. Answer this section on the answer sheet provided.

QUESTION 1

1.1 Three sisters shared R500 and divided it into R250. R150 and R100. In which the ratio is divided?

A. 3: 2: 1
B. 5: 3: 2
C. 5:4:3
D. $\frac{1}{2}$:3 :1 (2)

1.2 Which one of the following is NOT a prime number?

A. 23
B. 11
C. 2
D. 1 (2)

1.3 Arrange the following numbers in ascending order:

-135; 45; -139; 77; 0; -220

A. 77; 45; 0; -135; -139; -220
B. -135; -139; -220; 0; 77; 45
C. -220; -139; -135; 0; 45; 77
D. 0; 45; 77; -135; -139; -220 (2)

1.4 The LCM of 8; 12 and 20 is:

A. 120
B. 80
C. 2
D. 4 (2)

1.5 The value of the constant term in $2x^3 - 5x^2 + 3x - 9$ is:

A. -2
B. 9
C. -9
D. 5 (2)

1.6 20 learners wrote a math test and their results in percentage were as follows:

30; 22; 45; 44; 29; 59; 46; 61; 29; 56; 62; 35; 53; 35; 51; 26; 68; 86; 72; 64

The range is:

A. 64
B. 108
C. 57
D. 34 (2)

1.7 The factors of $p^4 - 1$ are:

A. $(p^2 - 1)(p^2 - 1)$
B. $(p - 1)(p + 1)$
C. $(p - 1)(p + 1)(p^2 - 1)$
D. $(p - 1)(p + 1)(p^2 + 1)$ (2)

1.8 Simplify: $4^{-2} + \left(\frac{1}{4}\right)^{-1}$

A. $4\frac{1}{16}$
B. 8
C. $2\frac{1}{4}$
D. 1 (2)

1.9 Solve for x: $\frac{x}{4} - \frac{x}{5} = 3$

A $\frac{60}{9}$
B. 20
C. 60
D. $\frac{60}{20}$ (2)

1.10 Simplify: $\sqrt{x^3}$

A x

B $\frac{x^3}{2}$

C Undefined number

D $x\sqrt{x}$

(2)

[20]

SECTION B

QUESTION 2

2.1 Simplify the following:

$5m^2np \times mn^2p^2 - 3m^3n^3p^3 \times (4mnp)^0$ (4)

2.2 Calculate the following without a calculator:

2.2.1 $\left(2\frac{1}{2}\right)^2 + (0,5)^2$ (3)

2.2.2 $\sqrt{\frac{0,08}{0,64} \times \sqrt{64}}$ (3)

2.3 If 6 gardeners can mow the grass of a soccer field in 2 hours, how many gardeners can mow the same soccer field in 3 hours? (2)

2.4

$$i = \frac{r}{100} \qquad A = P(1 + i.n) \qquad A = P(1 + i)^n$$

Miss Lee needs to draw up a budget of her monthly expenses. She earns R8 900 per month. Her bills in one month are: Rent: R2 100, Electricity R300, Car payments R 1 450, Insurance R370, Petrol R600 Clothing account repayment R655 and Groceries R1 350.

2.4.1 What are her total expenses for one month? (1)

2.4.2 How much money does she have left after paying all her expenses? (1)

2.4.3 She borrows money from the bank to fix her car. Calculate the simple interest on a R5 000 loan for 3 years at 8Type equation here.,5% interest. (3)

2.4.4 Her grandparents gives her R15 000 for her 21st birthday. Calculate the compound interest earned over 2years at 12% p.a. interest. (4)

[21]

QUESTION 3

3.1 Simplify the following expression

3.1.1 Add: $-4x + 6 + 11x - 5$ (2)

3.1.2 Multiply: $3(x - 1) - 4(x - 2)$ (3)

3.1.3 Calculate the value of $2x^2 - 4$ if $x = 3$ (2)

3.2 Simplify the following:

3.2.1 $\dfrac{(5x)^3y \times (2xy^2)^2}{15x^5y^2}$ (3)

3.2.2 $\dfrac{2x + 4y}{x + 2y}$ (2)

3.3 Factorise fully:

3.3.1 $x^2 - x - 6$ (2)

3.3.2 $18x^2 - 200$ (2)

[16]

QUESTION 4

4.1 Solve the following equations:

4.1.1 $3(x + 1) = 8x - 2$ (2)

4.1.2 $\dfrac{x + 7}{4} + \dfrac{3x - 1}{3} = 0$ (3)

4.2 Solve for x and y:

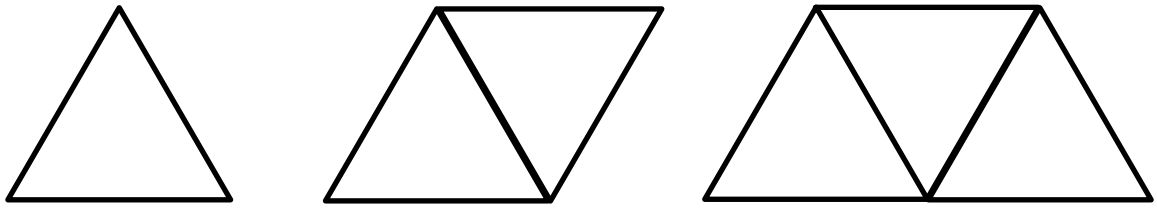
$x + 3y = 6 \ldots . (1)$ (4)

$-x + 8y = 5 \ldots \ldots . (2)$

[9]

QUESTION 5

Study the pattern below and attempt the questions beow:



Pattern 1 Pattern 2 Pattern 3

5.1 Copy the table and complete the table by writing down a pattern representing the number of sticks that makes each pattern:

Pattern	1	2	3	4	5	6
Number of sticks						

(3)

5.2 Describe the pattern in your own words. (1)

5.3 Write down the general term of the given sequence in the form:
T_n= _____ (2)

5.4 Without drawing the figures determine the number of sticks needed to build the 17^{th} figure (2)

[8]

QUESTION 6

6.1 On the grid (**ANNEXURE B)** plot the following two points and then join them.

6.1.1 (-3 ; 4) (1)

6.1.2 (2 ; -1) (1)

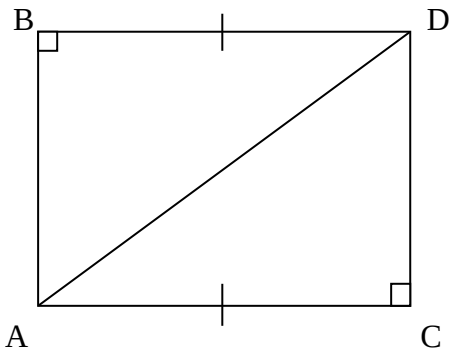
6.2 Determine the gradient of the line (2)

6.3 Determine the equation of the line in the form$y = mx + c$ (2)

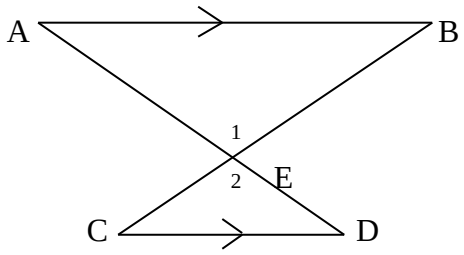
[6]

QUESTION 7

7.1 In the sketch below, prove with reasons that Δ FGH is congruent to Δ GHJ (4)



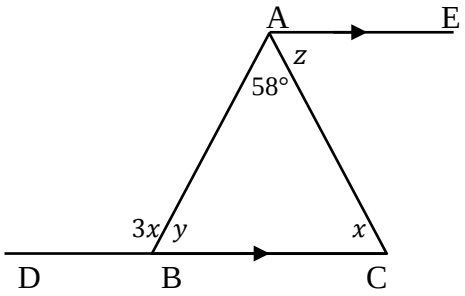
7.2 Given the figure below, show, giving reasons that Δ ABE is simillar to Δ DCE (4)



[8]

QUESTION 8

Study the following diagram and answer the questions below:



AE||DC

8.1 Determine , with reasons without using a protractor, the size of:

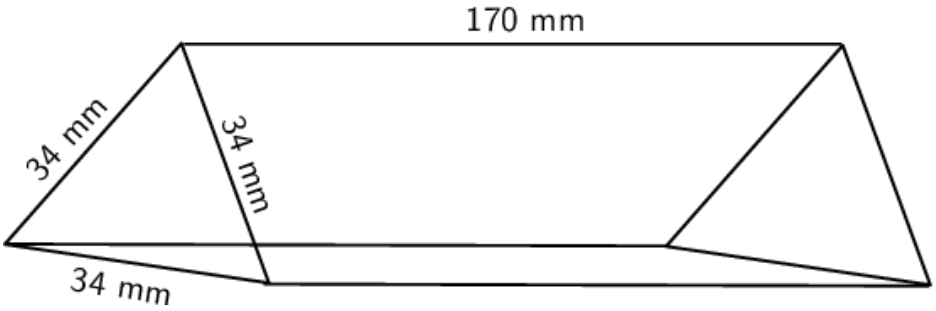
8.1.1 x (3)

8.1.2 y (2)

8.1.3 z (2)

8.2 Calculate the area of a rectangular carpet if the width is 8m and the diagonal measures 10m. (3)

8.3 Given the diagram below, answer the following questions:



8.3.1 Identify the figure represented above. (1)

8.3.2 Calculate the surface area of the above figure.. (3)

[14]

QUESTION 9

Do this question on **ANNEXURE C**

9.1 ΔABC with A(3;0), B(2;4) and C(0;2) is enlarge using the rule $(x; y) \rightarrow (2x;\ 2y)$. The resulting image is $A^1B^1C^1$
Draw ΔABC and its image on the given grid. (2)

9.2 ΔABC word gereflekteer om die *y*-as. Die refleksie is $A^{11}B^{11}C^{11}$.

9.2.1 Draw the image on the given grid. $A^{11}B^{11}C^{11}$ (3)

9.2.2 What is the distance between A and A^{11}? (1)

[6]

QUESTION 10

10.1 During the two days before Christmas, a clothing store sold a number of women's dresses in the following sizes.

30 18 26 42 40 20 24 34 26 42 36 32 40 32 18 38 26 30

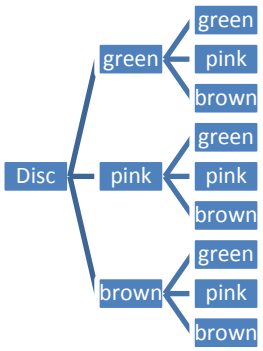
10.1.1 Calculate the mean of the data. (3)

10.1.2 What is the mode of the data. (1)

10.1.3 Determine the median of the data. (1)

10.1.4 What is the range of the data. (1)

10.2 A bag contains three coloured discs: green, pink and brown. The tree-diagram shows the possible outcomes when a disc is pulled out of the bag



10.2.1 Write down all the possible outcomes. (2)

10.2.2 Write down the total number of outcomes. (1)

10.2.3 Write down the probability of pulling out a brown and a brown (1)

10.2.4 Write down the probability that the first disc is a pink and the second disc is a green. (1)

10.2.5 Write down the probability of pulling out a purple disc (1)

[12]

TOTAAL: 120

ANNEXURE A:

NAME:---------- GRADE 9----------

MATHEMATICS: 2014
NOVEMBER EXAMINATION GRADE 9

SECTION A QUESTION 1

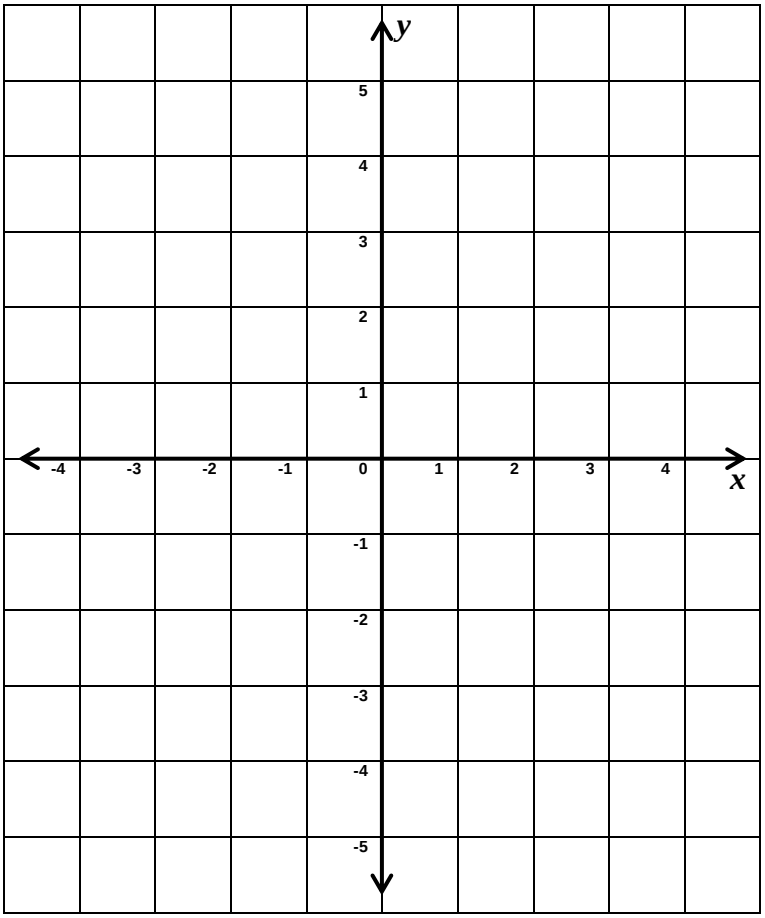
Answer sheet for Multiple Choice				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D

[10]

ANNEXURE B:

NAME:---------- GRADE 9----------

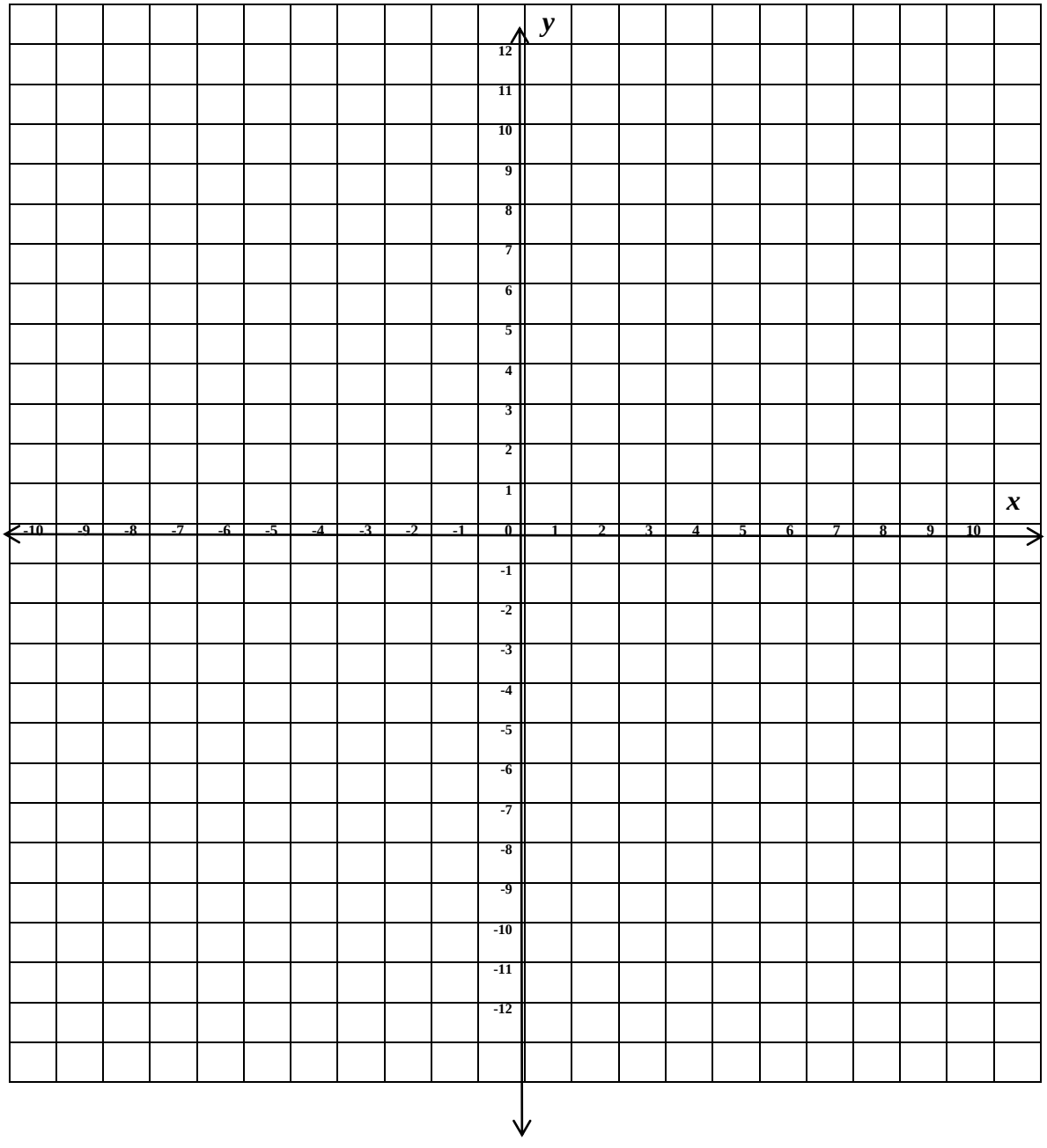
QUESTION 6.1



ANNEXURE C:

NAME:---------- GRADE 9----------

QUESTION 9.1 and 9.2.1



Grade 9 Examination Exemplar 1 Memo

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

QUESTION 1 VRAAG 1	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
1.1	B 5:3:2	answer /antwoord	(2)
1.2	D 1	answer /antwoord	(2)
1.3	C -220; -139; -135; 0; 45; 77	answer /antwoord	(2)
1.4	A LCM = 120	answer /antwoord	(2)
1.5	C -9	answer /antwoord	(2)
1.6	A 86 – 22 = 64	answer /antwoord	(2)
1.7	D $p^4 - 1$ $= (p^2 - 1)(p^2 + 1)$ $= (p - 1)(p + 1)(p^2 + 1)$	answer /antwoord	(2)
1.8	A $= \frac{1}{16} + 4$ $= 4\frac{1}{16}$	answer /antwoord	(2)
1.9	C $\frac{x}{4} - \frac{x}{5} = 3$ $5x - 4x = 60$ $x = 60$	answer /antwoord	(2)
1.10	D $x\sqrt{x}$	answer /antwoord	(2)
	TOTAL / TOTAAL	**20 marks /punte**	

QUESTION 2 VRAAG 2	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
2.1	$5m^2np \times mn^2p^2 - 3m^3n^3p^3 \times (4mnp)^0$ $= 5m^3n^3p^3 - 3m^3n^3p^3 \times 1$ $= 2\ m^3n^3p^3$	$5m^3n^3p^3$✓x 1✓ 2 $m^3n^3p^3$✓	(3)
2.2.1	$(\frac{5}{2})^2 + (\frac{5}{10})^2$ $= \frac{25}{4} + \frac{1}{4}$ $= \frac{26}{4}$ $= 6\frac{2}{4}$	Converting decimals to fractions✓ Squaring✓ Simplifying/adding✓ answer /antwoord	(3)
2.2.2	$\sqrt{\frac{8}{64} \times \frac{8}{1}}$ $= \sqrt{1}$ $= 1$	Converting decimals to fractions✓ Simplifying/adding✓ Determining the square roots✓ answer /antwoord	(3)
2.3	$3x = 6$ x 2 $3x = 12$ $x = 4$	$3x = 6$ x 2 ✓ $x = 4$ workers /werkers✓	(2)
2.4.1	2 100 + 300 + 1 450 + 370 + 600+ 655 +1 350 = R6825	answer /antwoord	(1)
2.4.2	8 900 – 6 825 = R2 075	answer /antwoord	(1)
2.4.3	A = P(1 + in) = 5 000(1 + 0.085 x 3) = 5 000(1,255) = R6 275 6 275 – 5 000 = R1 275	formula /formule substitution/ substitusie answer /antwoord	(1) (1) (1)
2.4.4	A = P(1 + i)^n = 15 000(1 + 0,12)^2 = R 9 600(1.12)^2 = R18 816 18 816 – 15 000 = R3 816	formula / formule substitution/substitusie answer /antwoord answer /antwoord	(1) (1) (1) (1)
TOTAL / TOTAAL		**16marks / punte**	

QUESTION 3 VRAAG 3	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
3.1.1	$: -4x + 6 + 11x - 5$ $= 7x + 1$	answer /antwoord	(1)
3.1.2	$-3(x-1) - 4(x-2)$ $-3x + 3 - 4x + 8$ $-7x + 11$	multiplying✓ answer /antwoord✓	(3)
3.1.3	$2x^2 - 4$ $= 2(3)^2 - 4$ $= 18 - 4$ $= 14$	substitution /substitusie answer /antwoord	(2)
3.2.1	$\frac{125x^3y \times 4x^2y^4}{15x^5y^2}$ $= \frac{100y^3}{3}$ $33\frac{1}{3}y^3$	$125x^3y \times 4x^2y^4$✓ Simplifying✓ ✓ answer /antwoord	(1) (1) (1) (1)
3.2.2	$\frac{2x+4y}{x+2y} = \frac{2(x+2y)}{x+2y}$ $= 2$	$2(x+2y)$✓ answer /antwoord✓	(1) (1)
3.3.1	$(x+2)(x-3)$	$(x+2)$✓ $(x-3)$✓	(1) (1)
3.3.2	$2(9x^2 - 100)$ $= 2(3x-10)(3x+10)$	2✓ $3x+10)$✓ $(3x-10)$✓	(1) (1) (1)
	TOTAL / TOTAAL	**16 marks / punte**	

QUESTION 4 VRAAG 4	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
4.1.1	$3(x+1) = 8x-2$ $3x+3 = 8x-2$ $3x-8x = -2-3$ $-5x = -5$ $x = 1$	$3x+3$✓ answer /antwoord	(1) (1)
4.1.2	$\frac{x+7}{4} + \frac{3x-1}{2} = 0$ $x+7+2(3x-1) = 0$ $x+7+6x-2 = 0$ $7x+5 = 0$ $7x = -5$ $x = -\frac{5}{7}$	$x+7$✓ $6x-2=0$✓ answer /antwoord	(1) (1) (1)
4.2	$x+3y=6$ ... (1) $-x+8y=5$ ... (2) $x=-3y+6$ *or* $x=6-3y$ …(3) (3) into (2) $-x+8y=5$ $-(6-3y)+8y=5$ $-6+3y+8y=5$ $11y=5+6$ $11y=11$ $y=1$ y=1 into (1) $x+3y=6$ $x+3(1)=6$ $x+3=6$ $x=6-3$ $x=3$	$x=-3y+6$ *or* $x=6-3y$✓ $-6+3y$✓ $y=1$✓ $x=3$✓	(1) (1) (1) (1)
TOTAL /TOTAAL		**9 marks / punte**	

QUESTION 5 VRAAG 5	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
5.1	<table><tr><td>Pattern Patroon</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Number of sticks Getal stokkies</td><td>3</td><td>5</td><td>7</td><td>9</td><td>11</td><td>13</td></tr></table>	3 and 5 ✓ 7 and 9 ✓ 11 and 13 ✓	(1) (1) (1)
5.2	Add 2 sticks to the previous pattern Tel 2 stokkies by die vorige patroon	answer /antwoord	(1)
5.3	$T_n = 2n + 1$	answer /antwoord	(2)
5.4	$T_{17} = 2(17) + 1$ $= 35$	substitution/substitusie answer /antwoord	(1) (1)
	TOTAL / TOTAAL	**8 marks / punte**	

QUESTION 6 VRAAG 6	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
6.1	ANNEXURE B / BYLAAG B	Plot co-ordinates Stip koördinate	(2)
6.2	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{-1-4}{2-(-3)}$ $= \frac{-1-4}{2+3}$ $= \frac{-5}{5}$ $= -1$	$\frac{-1-4}{2+3}$✓ answer /antwoord	(1) (1)
6.3	$y = -x + 1$	answer /antwoord	(2)
	TOTAL /TOTAAL	**6 marks / punte**	

QUESTION 7 VRAAG 7	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
7.1	In △ABD and △ACD AD = AD $\hat{B} = \hat{C}$ AB = CD △ ABD ≡ △ACD	 Common Both = 90° Given H; 90°, S	 (1) (1) (1) (1)
7.2	In △ABE and △DCE $\hat{B} = \hat{C}$ $\hat{A} = \hat{D}$ $\hat{E}_1 = \hat{E}_2$ △ ABD ||| △ACD	 Alt < AB || CD Alt < AB || CD Vert opp <'s A; A; A	(1) (1) (1) (1)
	TOTAL / TOTAAL	**8 marks / punte**	

QUESTION 8 VRAAG 8	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
8.1.1	$3x = 58° + x$ ext. < of Δ / buite < van Δ $3x - x = 58°$ $2x = 58°$ $x = 29°$	$3x = 58° + x$✓ Reason / rede answer /antwoord	(1) (1) (1)
8.1.2	y = 180°- (58° + x) sum int<Δ/som binne<Δ $= 180° - 87°$ = 93°	Reason/ rede answer /antwoord	(1) (1)
8.1.3	$z = x$= 29° alt. < / verw. <	reason / rede answer /antwoord	(1) (1)
8.2	= $(10m)^2 - (8m)^2$ Pythagoras = $100m^2 - 64m^2$ = $\sqrt{36}m^2$ = 6 m A = l x b = 6 x 8 = 48 m^2	 $\sqrt{36}$✓ 6 x 8 ✓ answer /antwoord	 (1) (1) (1)
8.3.1	Triangular prism	answer /antwoord	(1)
8.3.2	$\sqrt{34^2 - 17^2}$Pythagoras = 29,44mm SA = $2\left[\frac{1}{2}b \times \perp h\right] + 3(\ell \times b)$ = 2[$\frac{1}{2}$ x 34 x 29,44] + 3(170 x 34) = 1000,96 + 17340 = 18340,96 mm^2	 substitution / substitusie 1000,96 + 17340 answer /antwoord	 (1) (1) (1)
	TOTAL / TOTAAL	**14 marks / punte**	

QUESTION 9 VRAAG 9	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
9.1	**See annexure C / bylaag C**	image / refleksie	(2)
9.2.1	**See annexure C / bylaag C**	image / refleksie	(3)
9.2.2	6 (units)	answer / antwoord	(1)
	TOTAL / TOTAAL	**6 marks / punte**	

QUESTION 10 VRAAG 10	SOLUTIONS OPLOSSING	MARK ALLOCATION PUNTE TOEKENNING	
10.1.1	552÷18 = 30,67	552÷18 answer / antwoord	(2)
10.1.2	26	answer / antwoord	(1)
10.1.3	$\frac{30+32}{2}$ = 31	$\frac{30+32}{2}$ ✓ answer / antwoord	(1) (1)
10.1.4	42 – 18 = 24	42 – 18 ✓ answer / antwoord	(1)
10.2.1	GG GP GB PG PP PB BG BP BB	GG,GP,GB ✓ PG, PP, PB ✓ BG, BP, BB ✓	(1) (1) (1)
10.2.2	9	answer / antwoord	(1)
10.2.3	$\frac{1}{9}$	answer / antwoord	(1)
10.2.4	$\frac{2}{9}$	answer / antwoord	(1)
10.2.5	$\frac{0}{9} = 0$	answer / antwoord	(1)
	TOTAL / TOTAAL	**12 marks / punte**	

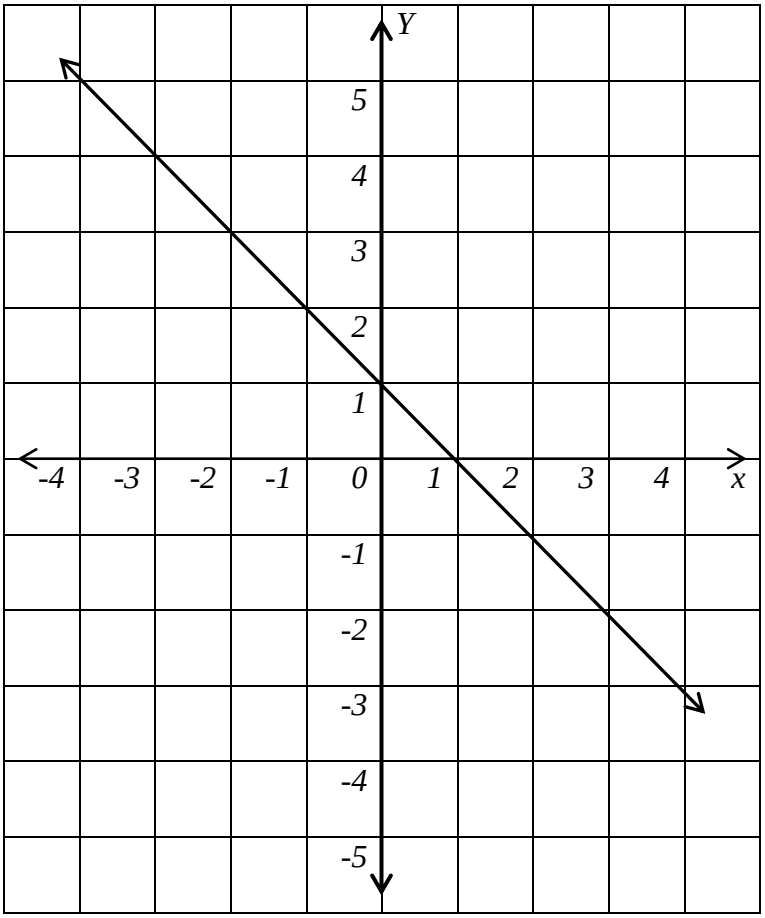
MATHEMATICS 2014 WISKUNDE
EXAMINATION GRADE 9 NOVEMBER EKSAMEN GRAAD 9

ANNEXURE A / BYLAAG A
SECTION A / AFDELING A
QUESTION 1 / VRAAG 1

Answer sheet for Multiple Choice Antwoordblad Meervoudige Keuse				
1	**A**	**B**	**C**	**D**
2	**A**	**B**	**C**	**D**
3	**A**	**B**	**C**	**D**
4	**A**	**B**	**C**	**D**
5	**A**	**B**	**C**	**D**
6	**A**	**B**	**C**	**D**
7	**A**	**B**	**C**	**D**
8	**A**	**B**	**C**	**D**
9	**A**	**B**	**C**	**D**
10	**A**	**B**	**C**	**D**

[10]

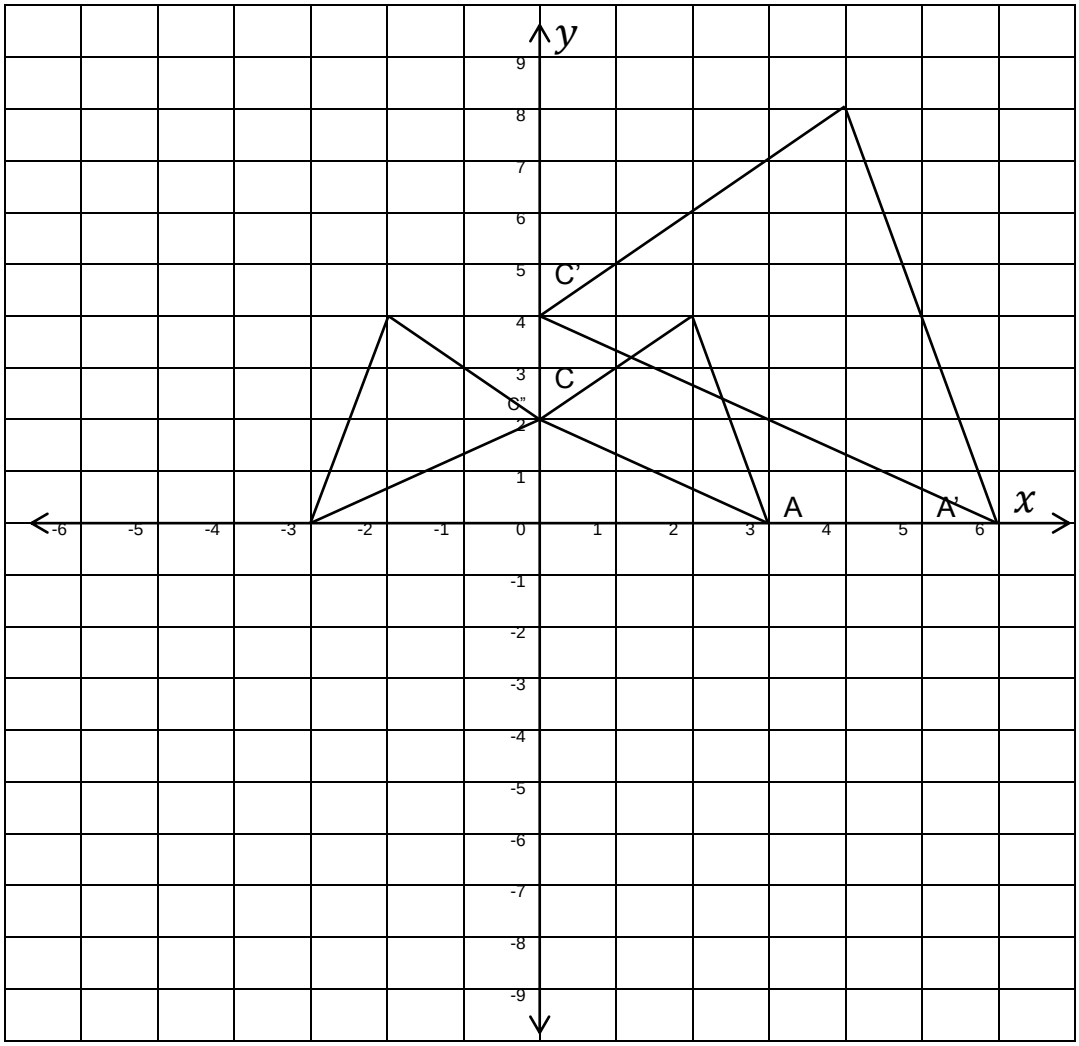
ANNEXURE B / BYLAAG B
QUESTION 6.1 / VRAAG 6.1



Plot (-3;4) correctly / stip (-3 ; 4) korrek (1)

Plot (2;-1) correctly / stip (2 ; -1) korrek (1)

ANNEXURE C / BYLAAG C:
QUESTION 9.1 and 9.2.1 / VRAAG 9.1 en 9.2.1



ΔABC (1)
ΔABC image / beeld (1)
ΔABC reflection / refleksie (1)
ΔABC and ΔABC reflection meet at (0,2)
ΔABC enΔABCrefekteer en ontmoet by (0 ; 2) (1)

Grade 9 Examination Exemplar 2

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

INSTRUCTIONS AND INFORMATION (2013)

1. The question paper consist of Section A (Multiple Choice) and Section B.
2. Answer sheets for Questions 1; 6; 9.1, 9.2 and 9.3 are provided.(**See the Annexures). These sheets must be handed in with your answer book.**
3. All questions are COMPULSORY.
4. All sketches and diagrams are NOT DRAWN TO SCALE!
5. A non-programmable calculator may be used unless otherwise stated.
6. Show all calculations in Section B
7. You are going to need:
   - Answer book
   - Pen, pencil, eraser and ruler
   - Calculator

SECTION A : MULTIPLE CHOICE QUESTION

There are **ten** multiple choice questions in **Section A.** For each question **four** possible answers are given and only **one** answer is correct. For each multiple choice question select an answer and indicate your choice by means of a cross on the corresponding letter on the answer sheet. (**ANNEXURE A)**

EXAMPLE: The table represents the temperature per month for a city over a period of six months.

Month	February	March	April	May	June	July
Temperature	32^0 C	28^0 C	24^0 C	15^0 C	8^0 C	4^0 C

What is the range of the temperature experienced over the six months?

A. 4^0 C
B. 24^0 C
C. 23^0 C
D. 28^0 C

The correct answer is 28^0 C; therefore indicate your choice by a cross on D like this on Annexure A:

A	B	C	~~D~~

SECTION A
QUESTION 1

1.1 $\sqrt[3]{27x^{27}}$ is:

E. $7x$
F. $9x^3$
G. $9x^9$
H. $3x^9$

2

1.2 The value of x if x is a rational number is:

E. π
F. $\sqrt{-1}$
G. $1,2\dot{3}$
H. $\sqrt{10}$

2

1.3 For which value(s) of x if $x \in$ {-3; -1; 3; 4} is $-\sqrt{\frac{4}{3-x}}$ a rational number?

E. 4
F. -1
G. 3 and 4
H. -3

2

1.4 The HCF of 18; 24 and 32 is:

E. 2
F. 288
G. 6
H. 8

2

1.5 The coefficient of x^2 in $3x^3 - 2x^2 + 5x - 1$ is:

E. -2
F. 2
G. -1
H. 5

2

1.6 The following are the marks out of 10 that a group of 15 learners obtained in a class test:

7 3 8 9 5 10 7 6 4 2 7 5 8 2 3

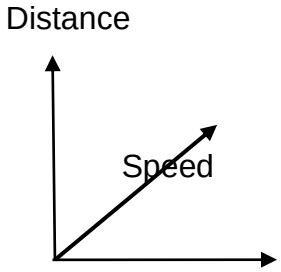
The median is:

E. 7
F. 8
G. 6
H. 5,7 2

1.7 $(x^a - 3)(x^a + 3)$

E. $x^a - 9$
F. $x^{2a} - 9$
G. $x^a + 9$
H. $x^{2a} - 9$ 2

1.8 The graph below represents the motion of a car. The graph shows us that the car is:



E. accelerating
F. travelling north-east
G. travelling uphill
H. travelling at a constant speed 2

1.9 The number $\frac{1}{3} \times \frac{1}{2} \div \frac{1}{3}$ is equal to:

A $\frac{1}{2}$
E. 1
F. 2
G. $\frac{1}{18}$ 2

1.10 Sipho memorized 5 out of 7 songs for a music competition. What percent of the songs did he memorize?

A. 0,71%
B. 140%
C. 1,4%
D. 71% 2

[20]

SECTION B
QUESTION 2

2.1 Simplify:

$$\frac{(8x)^0 \times (3xy^2)^3}{12x^5y^2}$$ 3

2.2 Calculate the following with a calculator:

2.2.1 $4{,}85 \times 10^{-4} \times 2 \times 10^{-5}$ 2

2.2.2 $3{,}1 \times 10^4 + 0{,}061 \times 10^7$ 2

2.3 A car travelling at an average speed of 150 km/h covers a certain distance in 3 hours. How long will it take the car to travel the same distance at a speed of 120 km/h? 3

2.4

$i = \frac{r}{100}$	A = P(1 + in)	A = P(1 + i)^n	A = P(1 - i)^n

Study the lounge suite advert below:

LOUNGE SUITE FOR SALE
ONLY R600 DEPOSIT!
24 months to pay
Cash price R9 500

2.4.1 Mr Mabatha decides to pay the deposit of R600 and to pay the balance over 24 months at 17% p.a. simple interest. Calculate his monthly payment. 4

2.4.2 If inflation interest rate is estimated at 6,5% per annum compound interest. What will the cash price of his lounge suite be in 4 years' time on the cash price? 3

[17]

QUESTION 3

3.1 Simplify:

3.1.1 Subtract $4x^2y - 7x^3 - 3xy^2$ from $4xy^2 - 9x^3$ and write your answer in descending powers of x 4

3.1.2 $(x+1)^2 - (x+1)(x-1) - 2$ 4

3.1.3 $\dfrac{10a^2 - 5a}{5a}$ 2

3.2 Factorise fully:

3.2.1 $0{,}3x^2 - 1{,}2x$ 2

3.2.2 $x(a+1) + y(1+a)$ 2

[14]

QUESTION 4

Solve the following equations:

4.1 $3(x-1) = 2x + 5$ 2

4.2 $\frac{2x+7}{6} + \frac{x-5}{3} = 0$ 3

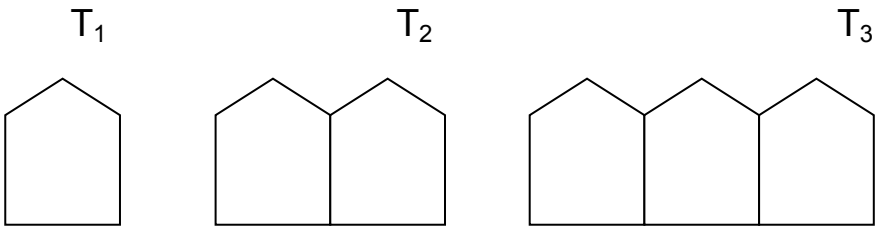
4.3 $x^2 = 25$ 2

4.4 $2^x = 32$ 2

[9]

QUESTION 5

Sipho is using sticks to build pentagon patterns



5.1 Copy the table and complete the table by writing down a pattern representing the number of sticks:

Pattern	1	2	3	4	5
Number of sticks	5	9	13		

2

5.2 Describe the pattern in your own words. 1

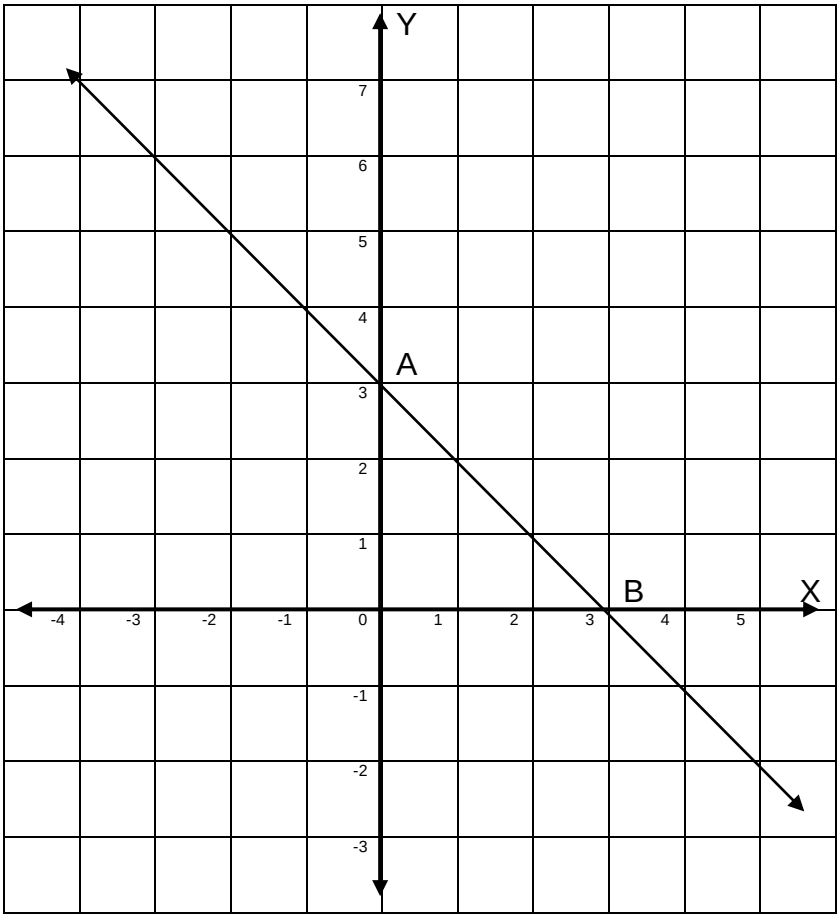
5.3 Write down the general term of the given sequence in the form: 2
T_n = _____

5.4 Without drawing the figures determine the number of sticks needed to build the 20th figure 2

[7]

QUESTION 6

AB represents the graph of $y = ax + q$ (*y = mx - c)* for all real values of x



6.1 Determine the value of the gradient of AB 1

6.2 Determine the equation of AB in the form $y = ax + q$ (*y = mx - c)* 2

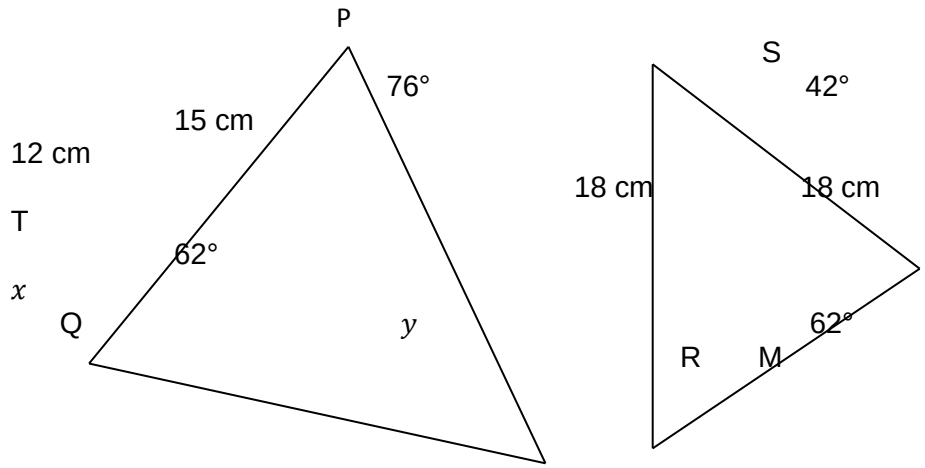
6.3 On the same grid draw the graph of $y = 2x + 1$ for $x \in R$ **(ANNEXURE B)** 3

6.4 From the graph, determine the value $(x; y)$ where the two graphs are equal. (intersects) Show your outcome on the graph with the symbol, M 1

[7]

QUESTION 7

7.1

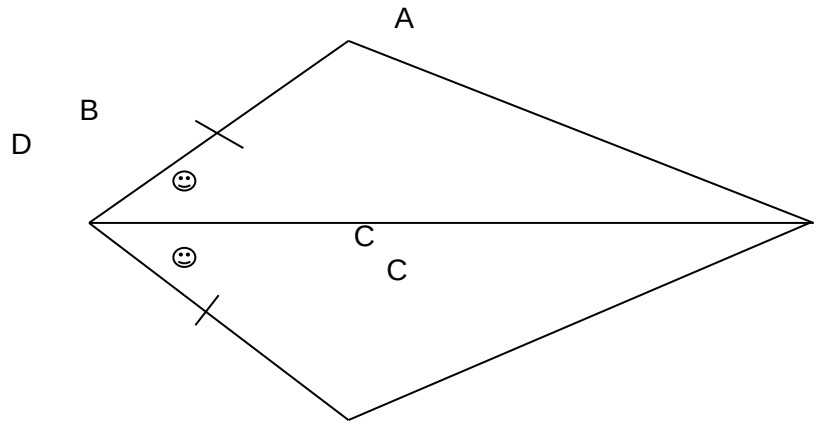


7.1.1 Calculate the size of $\hat{T}$ with reasons 2

7.1.2 Give a reason why ΔPQR /// Δ TMS 1

7.1.3 Determine the value of x and y 4

7.2 Quadrilateral ABCD is given with AB = BC and $A\hat{B}D = C\hat{B}D$

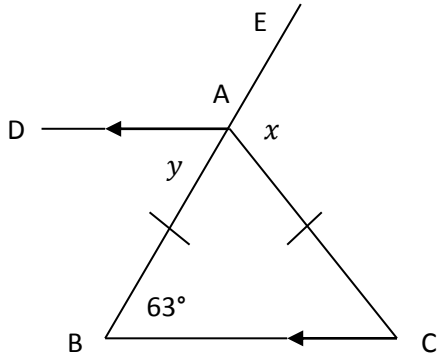


Prove Δ ABD ≡ Δ CBD with reasons 4

[11]

QUESTION 8

8.1

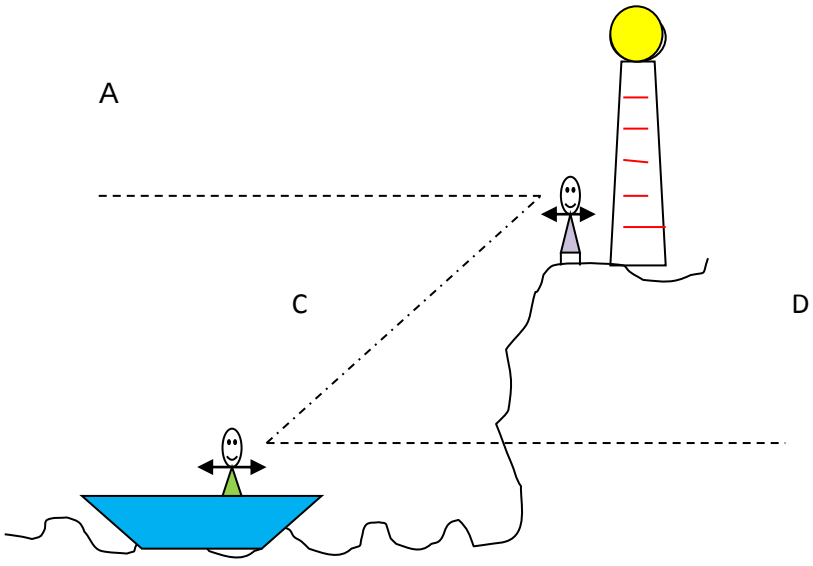


DA // BC
Determine , with reasons without using a protractor, the size of:

8.1.1 x 4

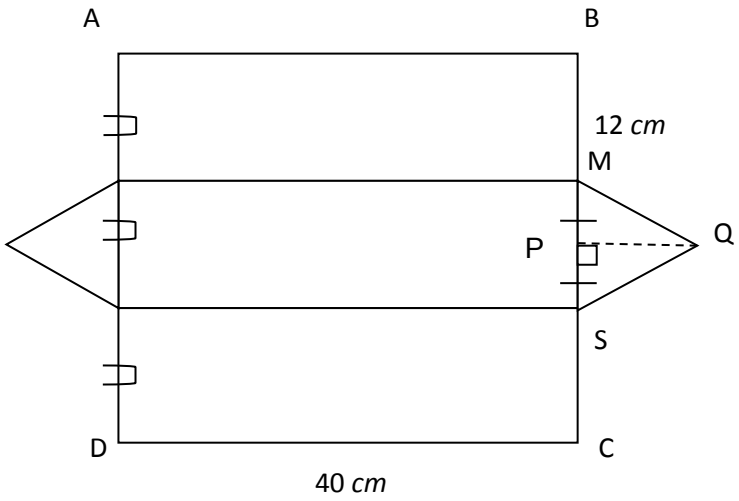
8.1.2 y 2

8.2 In the sketch below which angle $A\hat{B}C$ or $B\hat{C}D$ represent an angle of depression?



1

8.3



8.3.1 Identify the object represented in the above net. 1

8.3.2 Calculate the length of PQ. Leave your answer in surd form. 3

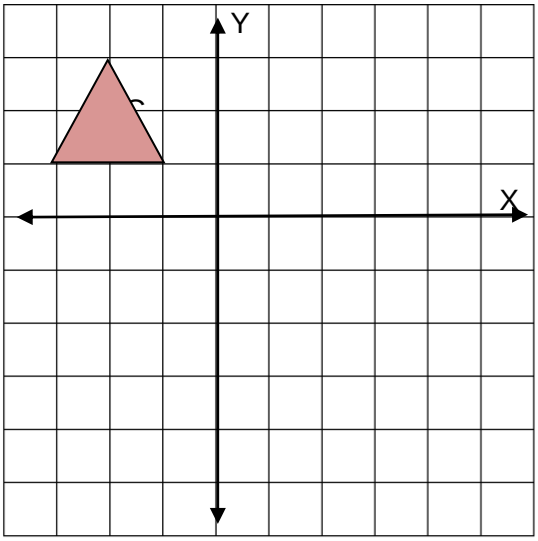
8.3.3 Calculate the volume of the above figure if PQ = 10,4 *cm.* 2

8.3.4 Calculate the perimeter of ΔMSQ 1

[14]

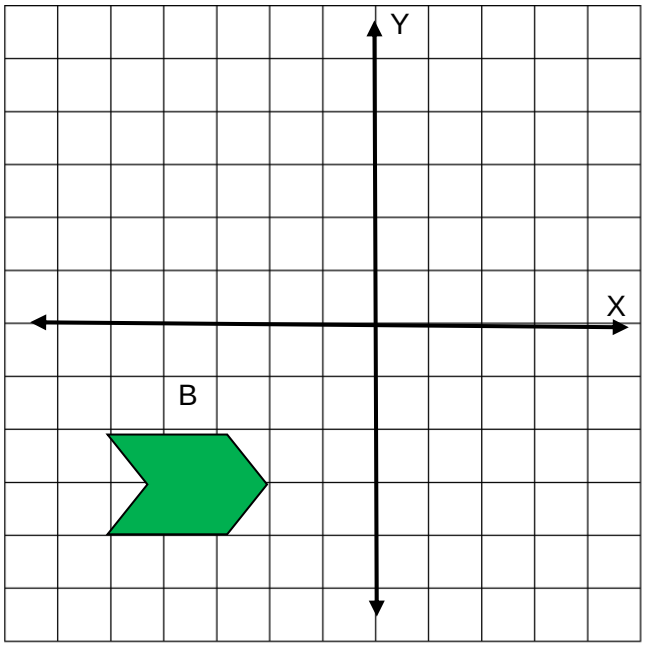
QUESTION 9

9.1 Draw image C^1 the translation of Δ C using the rule (x + 4; y – 3)
To be done on **ANNEXURE C**



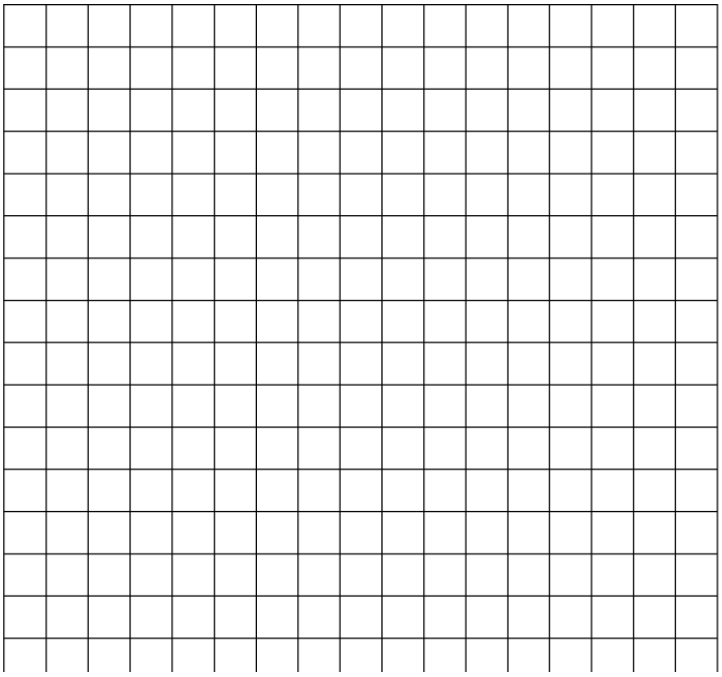
2

9.2 Draw image B^1, the reflection of B in the X-axis on the grid
To be done on **ANNEXURE D**



2

9.3 Triangle ABC with A(6;0), B(2;8) and C(4;-2) is reduce using the rule $(x; y) \rightarrow \left(\frac{1}{2}x; \frac{1}{2}y\right)$. The resulting image is $A^1B^1C^1$. Draw ΔABC and its image on the given grid **(ANNEXURE E)** 2

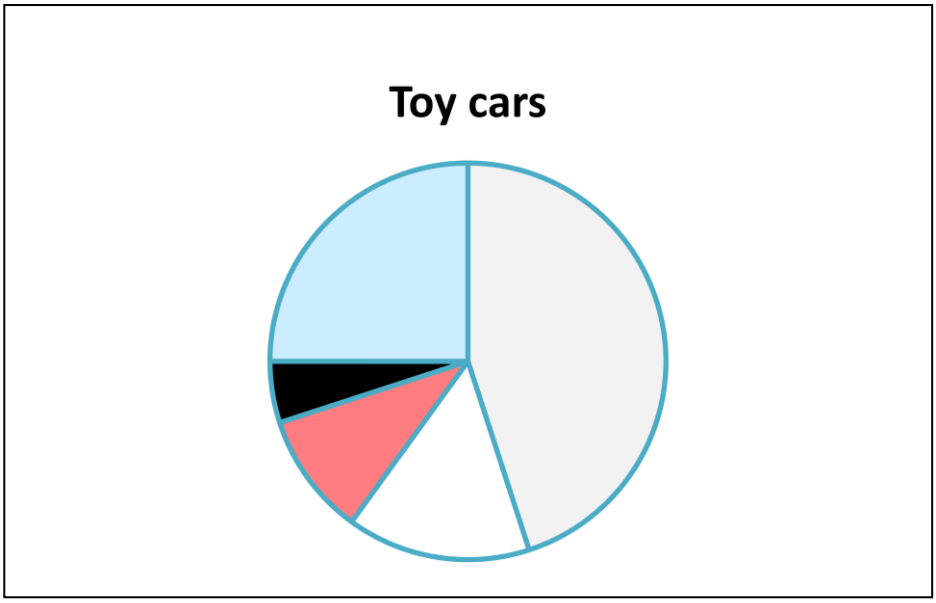


[6]

QUESTION 10

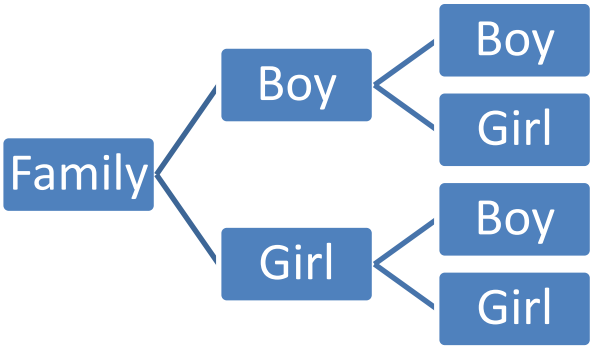
10.1 James collects classic toy cars. The pie chart represents the colour of these cars. In total he has 220. He has 22 red cars

Silver – 45%
Blue – 15%
Red – ?
Black – 5%
White – 25%



10.1.1	Determine the percentage of red toy cars James has	2
10.1.2	Determine the number of white toy cars James has.	1
10.1.3	Determine the number of silver cars he has.	2
10.1.4	Determine the degrees of pie chart that has been taken up by the number of blue cars.	2
10.1.5	Determine the mode of the data.	1
10.1.6	What is the range according to the percentages?	2

10.2 The tree-diagram shows the possible outcomes when two children (boy or girl) are born in a family.



10.2.1	Write down all the possible outcomes	1
10.2.2	Write down the number of the outcomes	1
10.2.3	Write down the probability that both children are boys	1
10.2.4	Write down the probability that the first child is a girl and the second child is a boy.	1
10.2.5	Write down the probability that the two children will be a different gender.	1

[15]

TOTAL: 120

ANNEXURE A: SECTION A QUESTION 1

NAME:…… GRADE:……

MATHEMATICS: 2013

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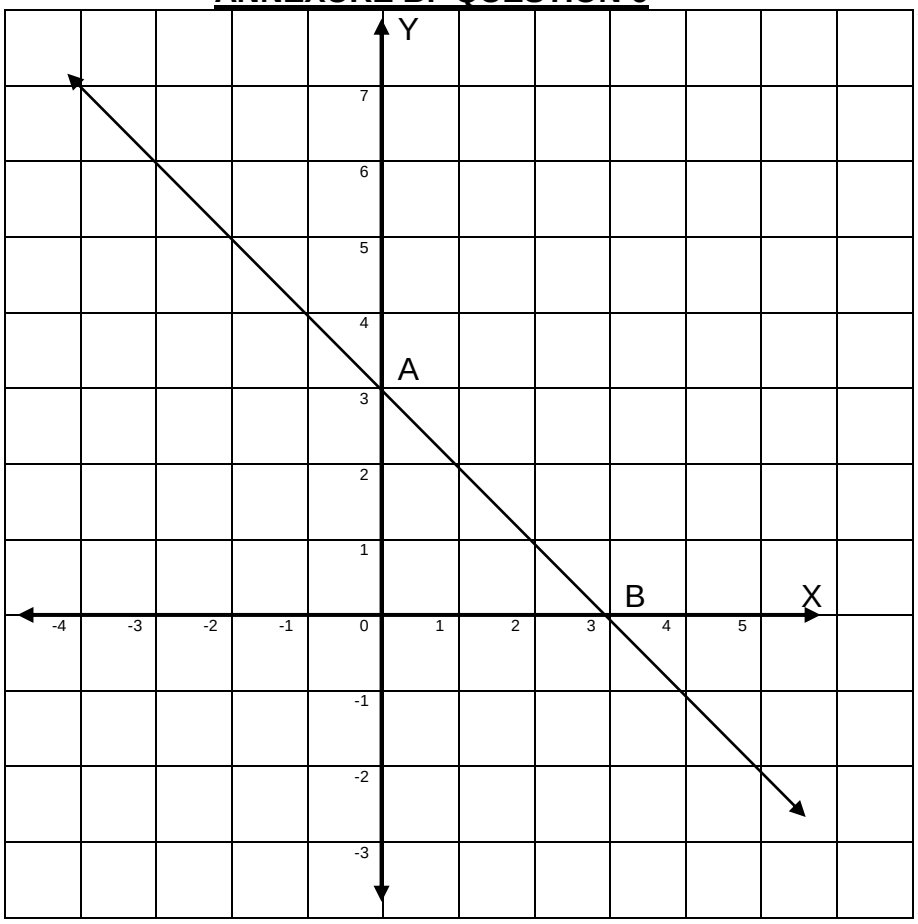
Answer sheet for Question 1 (Multiple Choice)

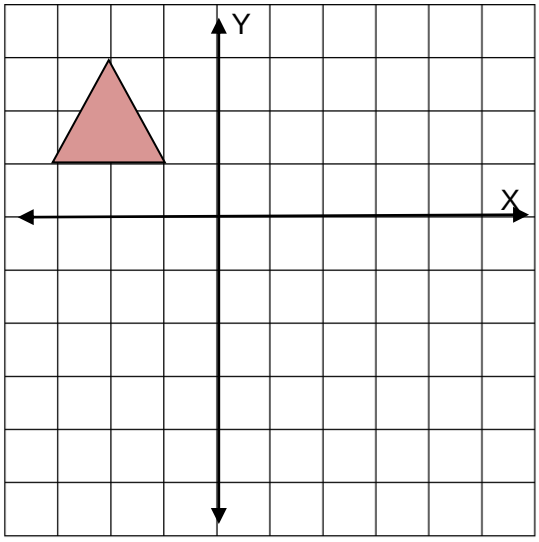
Answer sheet for the Multiple Choice Questions				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D

NAME: ……. **GRADE: ……..**

ANNEXURE B: QUESTION 6

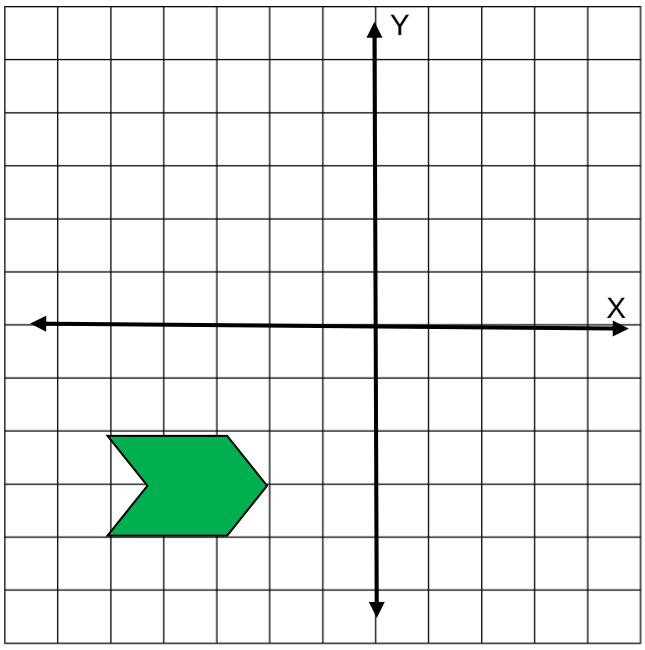


ANNEXURE C: QUESTION 9.1

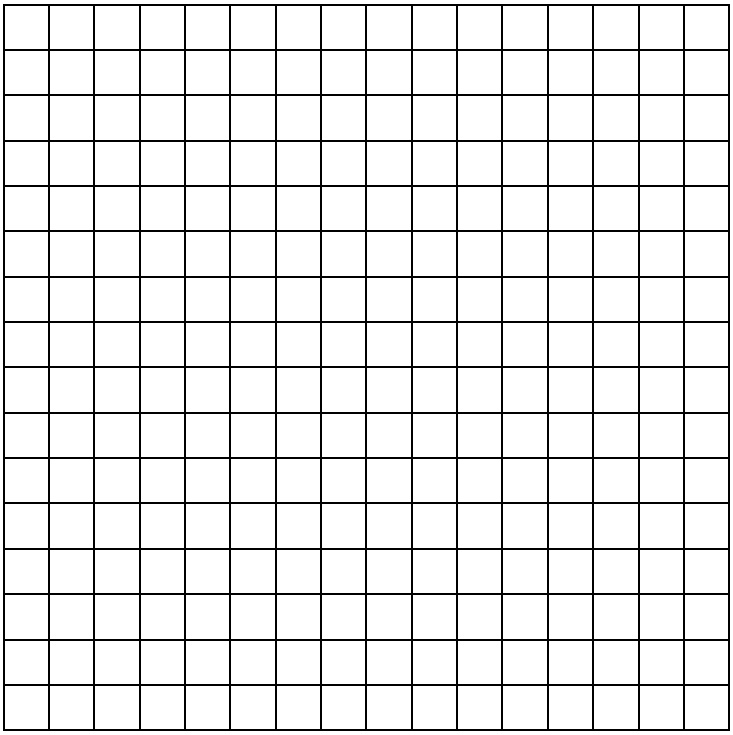


NAME: ……

ANNEXURE D: QUESTION 9.2



ANNEXURE E: QUESTION 9.3



Grade 9 Examination Exemplar 2 Memo

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

QUESTION 1	SOLUTIONS	MARK ALLOCATION
1.1	D	Correct answer 2 marks
1.2	C	Correct answer 2 marks
1.3	B $-\sqrt{\frac{4}{3-(-1)}}$ $-\sqrt{\frac{4}{4}}$ -1	Correct answer 2 marks
1.4	A 18 = 2.3.3 24 = 2.3 2.2 32 = 2 2.2.2.2 HCF: 2	Correct answer 2 marks
1.5	A	Correct answer 2 marks
1.6	C 2; 2; 3; 3; 4; 5; 5; **6**; 7; 7; 7; 8; 8; 9; 10	Correct answer 2 marks
1.7	D	Correct answer 2 marks
1.8	D	Correct answer 2 marks
1.9	A $\frac{1}{3} \times \frac{1}{2} \times \frac{3}{1} = \frac{1}{2}$	Correct answer 2 marks
1.10	D $\frac{5}{7} \times 10 = 7{,}42857143$ $\approx$71%	Correct answer 2 marks
	TOTAL	**20 marks**

QUESTION 2	SOLUTIONS	MARK ALLOCATION
2.1	$\frac{(8x)^0 \times (3xy^2)^3}{12\,x^5y^2}$ $= \frac{(1)(27x^3y^6)}{12x^5y^2}$	$(8x)^0 = 1$ 1 mark $(3xy^2)^3 = 27x^3y^6$ 1 mark

	$= \frac{9y^4}{4x^2}$	$\frac{9y^4}{4x^2}$ 1 mark
2.2.1	$9{,}7 \times 10^{-9}$	Correct answer 2 marks
2.2.2	$6{,}41 \times 10^{5}$	Correct answer 2 marks
2.3	<table><tr><td>SPEED (km/h)</td><td>TIME (h)</td></tr><tr><td>150</td><td>3</td></tr><tr><td>120</td><td>x</td></tr></table> $120x = (150)(3)$ $x = 3{,}75$ It will take Sipho 3,75 hours	Table 1 mark $120x = (150)(3)$ 1 mark Correct answer 1 mark
2.4.1	Amount outstanding: R9 500 – R600 = R8 900 $i = \frac{17}{100} = 0{,}17$ A = P(1 + in) = R8 900[1 + (0,17)(2)] = R 8 900(1,340 = R11 926 OR $I = \frac{Ktr}{100} = \frac{R(8\,900)(2)(17)}{100}$ = R3 026 A = R3 026 + R8 900 = R11 926 Monthly payment: R$\frac{11\,926}{24}$ = R 496,92	Amount outstanding: R8 900 1 mark Substitution 1 mark R11 926 1 mark Or $I = \frac{Ktr}{100}$ $= \frac{R(8\,900)(2)(17)}{100}$ 1 mark = R3 026 1 mark A = R11 926 1 mark Monthly instalment: R496,92 1 mark
2.4.2	A = P(1 – i)^n = R9 500(1 – 0,065)^4 = R 9 500(0,935)^4 = R 7 260,56	i = 0,065 1 mark Substitution 1 mark Correct answer 1 mark
	TOTAL	**17 marks**

QUESTION 3	**SOLUTIONS**	**MARK ALLOCATION**
3.1.1	$-9x^3 \quad + 4xy^2$ $\underline{-7x^3 + 4x^2y - 3xy^2}$ $-2x^3 - 4x^2y + 7xy^2$ OR $-9x^3 + 4xy^2 - (-7x^3 + 4x^2y - 3xy^2)$ $= -9x^3 + 4xy^2 + 7x^3 - 4x^2y + 3xy^2$ $= -2x^3 - 4x^2y + 7xy^2$	Correct order 1 mark $-2x^3$ 1 mark $-4x^2y$ 1 mark $+7xy^2$ 1 mark
3.1.2	$(x+1)^2 - (x+1)(x-1) - 2$ $= x^2 + 2x + 1 - (x^2 - 1) - 2$	$x^2 + 2x + 1$ 1 mark

	$= x^2 + 2x + 1 - x^2 + 1 - 2$ $= 2x$	$(x^2 - 1)$ 1 mark $-x^2 + 1$ 1 mark Correct answer 1 mark
	$\frac{10a^2 - 5a}{5a}$ $= \frac{5a(2a-1)}{5a}$ OR $\frac{10a^2}{5a} - \frac{5a}{5a}$ = 2a - 1	Factorisation / division 1 mark Correct answer 1 mark
3.2.1	$0{,}3x^2 - 1{,}2x$ OR $\frac{3x^2}{10} - \frac{12x}{10}$ $= 0{,}3x(x - 0{,}4)$ $= \frac{3x}{10}(x - 4)$	$0{,}3x$ as a common factor 1 mark $(x - 0{,}4)$ 1 mark
3.3.2	$x(a + 1) + y(1 + a)$ $= (a + 1)(x + y)$	$(a + 1)$ 1 mark $(x + y)$ 1 mark

	TOTAL	**14 marks**
QUESTION 4	**SOLUTIONS**	**MARK ALLOCATION**
4.1	$3(x-1) = 2x+5$ $3x-3 = 2x+5$ $x = 8$	$3x-3$ 1 mark Correct answer 1 mark
4.2	$\frac{2x+7}{6} + \frac{x-5}{3} = 0$ $2x+7+2(x-5) = 0$ $2x+7+2x-10 = 0$ $4x-3 = 0$ $4x = 3$ $x = \frac{3}{4}$	$+2x-10$ 1 mark $4x-3=0$ 1 mark Correct answer 1 mark
4.3	$x^2 = 25$ $x = \pm 5$ OR $(x-5)(x+5) = 0$ $x = 5$ or $x = -5$	$x = 5$ 1 mark $x = -5$ 1 mark
4.4	$2^x = 32$ $2^x = 2^5$ $x = 5$	2^5 1 mark Correct answer 1 mark
	TOTAL	**9 marks**
QUESTION 5	**SOLUTIONS**	**MARK ALLOCATION**
5.1	<table><tr><td>Pattern</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of sticks</td><td>5</td><td>9</td><td>13</td><td>17</td><td>21</td></tr></table>	17 1 mark 21 1 mark
5.2	Add 4 sticks to the previous pattern	Correct answer 1 mark
5.3	$T_n = 4n + 1$	Correct answer 2 marks
5.4	$T_{20} = 4(20) + 1$ $= 81$	Correct answer 2 marks
	TOTAL	**7 marks**
QUESTION 6	**SOLUTIONS**	**MARK ALLOCATION**
6.1	$M_{AB} = \frac{-3}{3} = -1$	Correct answer 1 mark
6.2	$y = -x + 3$	Correct answer 2 marks
6.3	If $x = 0$ $\therefore y = 1$ If $y = 0$ $\therefore x = -\frac{1}{2}$ *Any other method can be used for 2 marks* **See annexure B for graph**	$y = 1$ 1 mark $x = -\frac{1}{2}$ 1 mark Graph 1 mark
6.4	M$(\frac{2}{3}; 2\frac{1}{3})$ Estimation accepted (0,5; 2,5)	Correct answer 1 mark
	TOTAL	**7 marks**

QUESTION 7	SOLUTIONS	MARK ALLOCATION
7.1.1	$\hat{T}$ + 62° + 42° = 180° $\hat{T}$ = 76° interior angles of triangle	76° 1 mark Reason 1 mark
7.1.2	Angles are equal	1 mark
7.1.3	$\frac{PQ}{TM} = \frac{QR}{MS} = \frac{PR}{TS}$ ΔPQR /// Δ TMS $\frac{15}{x} = \frac{y}{18} = \frac{18}{12}$ $\frac{15}{x} = \frac{18}{12}$ $\frac{y}{18} = \frac{18}{12}$ $18x = 180$ $12y = 324$ $x = 10$ $y = 27$	$\frac{15}{x} = \frac{18}{12}$ 1 mark $x = 10$ 1 mark $\frac{y}{18} = \frac{18}{12}$ 1 mark $y = 27$ 1 mark
7.2	In Δ ABD and Δ CBD is: AB = CB given $A\hat{B}D = C\hat{B}D$ given BD = BD common Δ ABD ≡ Δ CBD SAS	AB = CB 1 mark $\hat{B}_1 = \hat{B}_2$ 1 mark BD = BD 1 mark SAS 1 mark
	TOTAL	**10 marks**

QUESTION 8	SOLUTIONS	MARK ALLOCATION
8.1.1	$\hat{C}$ = 63° angles opposite equal sides x = 63° + 63° exterior angles of triangle x = 126° OR $\hat{C}$ = 63° angles opposite equal sides B$\hat{A}$C + $\hat{C}$ + 63°= 180° interior angles of Δ B$\hat{A}$C + x = 180° angles on straight line x = 126°	$\hat{C}$ = 63° 1 mark Reason 1 mark x = 126° 1 mark Reason 1 mark
8.1.2	y = 63° alternate angles, DA//BC	y = 63° 1 mark alternate angles, DA//BC 1 mark
8.2	A$\hat{B}$C	1 mark
8.3.1	Triangular prism	Correct answer 1 mark
8.3.2	PQ² = QS² - PS² Pythagoras = (12 *cm*)² - (6 *cm*)² = 144 *cm*² - 36 *cm*² = 108 *cm*² PQ = $\sqrt{108}$ *cm* OR $6\sqrt{3}$ *cm*	Substitution 1 mark 108 *cm*² 1 mark Correct answer 1 mark
8.3.3	V = $\frac{1}{2}$ bhH = $\left(\frac{1}{2}\right)$(12 *cm*)(10,4 *cm*)(40 *cm*) = 2496 *cm*³	Substitution 1 mark Correct answer 1 mark
8.3.4	Perimeter: 12 *cm* + 12 *cm* + 12 *cm*	Correct answer 1 mark

	= 36 *cm*	
	TOTAL	**14 marks**
QUESTION 9	**SOLUTIONS**	**MARK ALLOCATION**
9.1	**See annexure C**	Correct image 2 marks
9.2	**See annexure D**	Correct image 2 marks
9.3	**See annexure E**	ΔABC 1 mark Image 1 mark
	TOTAL	**6 marks**
QUESTION 10	**SOLUTIONS**	**MARK ALLOCATION**
10.1.1	Red cars: 10%	Correct answer 1 mark
10.1.2	White cars: $\frac{25}{100} \times \frac{220}{1}$ = 55	$\frac{25}{100} \times \frac{220}{1}$ 1 mark Correct answer 1 mark
10.1.3	$\frac{45}{100} \times \frac{220}{1}$ = 99	$\frac{45}{100} \times \frac{220}{1}$ 1 mark Correct answer 1 mark
10.1.4	15% of 360° = $\frac{15}{100} \times 360°$ = 54°	= $\frac{15}{100} \times 360°$ 1 mark Correct answer 1 mark
10.1.5	Silver	Correct answer 1 mark
10.1.6	Range: 45% - 5% = 40%	45% - 5% 1mark Correct answer 1 mark
10.2.1	BB BG GB GG	All 4 answers 1 mark
10.2.2	4	Correct answer 1 mark
10.2.3	$\frac{1}{4}$	Correct answer 1 mark
10.2.4	$\frac{1}{4}$	Correct answer 1 mark
10.2.5	$\frac{2}{4} = \frac{1}{2}$	Correct answer 1 mark

MATHEMATICS: 2013
NOVEMBER PROVINCIAL EXAMINATION GRADE 9

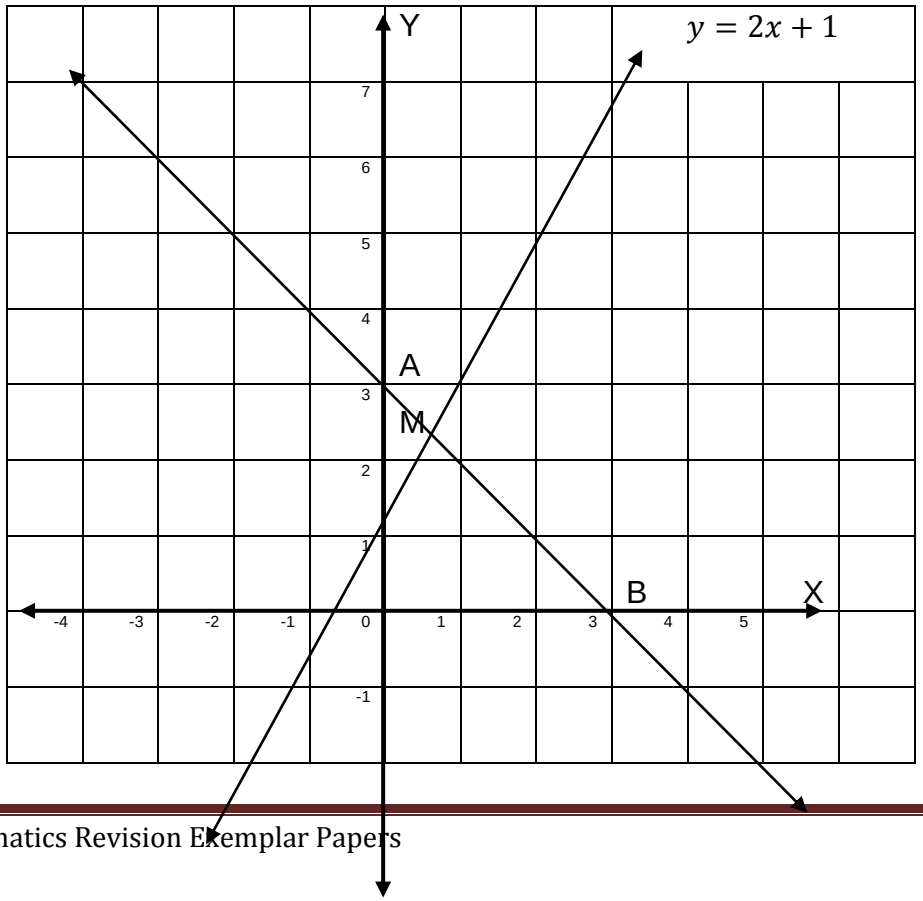
ANNEXURE A: SECTION A QUESTION 1

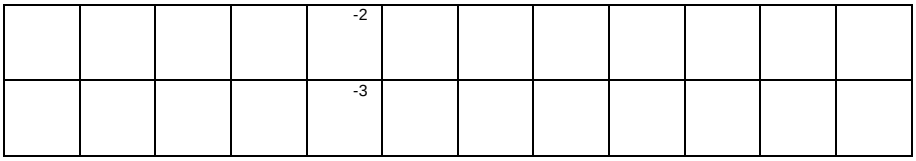
NAME:…… GRADE:……

Answer sheet for Question 1 (Multiple Choice)

Answer sheet for the Multiple Choice Questions				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D

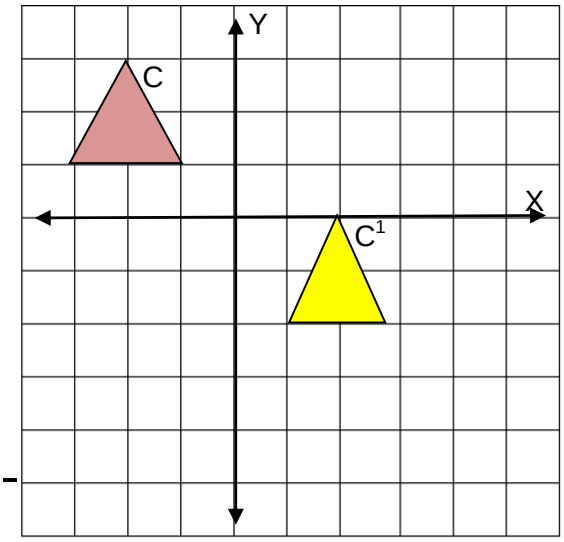
ANNEXURE B: QUESTION 6.3





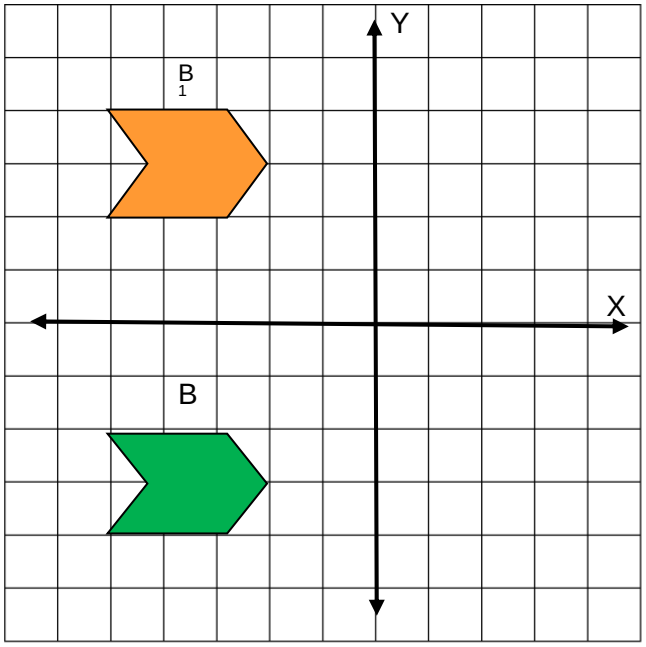
1 mark for Y-axis intercept at 1
1 mark for X-axis intercept at $-\frac{1}{2}$

ANNEXURE C: QUESTION 9.1



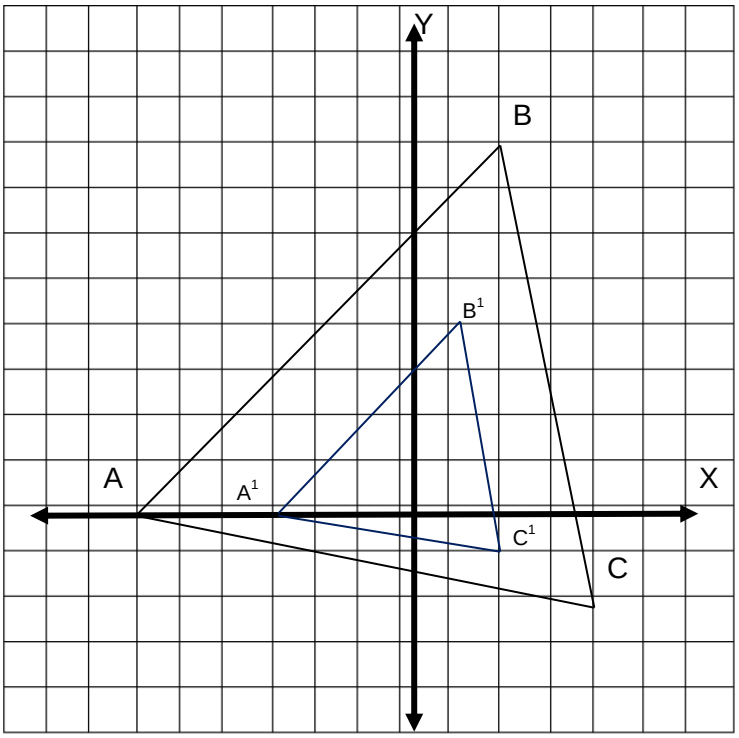
1 mark: 4 places to right
1 mark: 3 places down

ANNEXURE D: QUESTION 9.2



2 marks

ANNEXURE E: QUESTION 9.3



1 mark for Δ ABC
1 mark for image

Grade 9 Examination Exemplar 3

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SECTION A and SECTION B based on the prescribed content framework in the CAPS document.

   SECTION A: MULTIPLE-CHOICE QUESTIONS

   QUESTION 1: Ten multiple-choice questions based on all five content areas
   Answer this section on the answer sheet provided.

   SECTION B: SEVEN QUESTIONS BASED ON FIVE CONTENT AREAS

   QUESTION 2: Numbers, operations and relations

   QUESTION 3: Patterns and algebra

   QUESTION 4: Algebra

   QUESTION 5: Functions

   QUESTION 6: Space and shapes

   QUESTION 7: Measurement

   QUESTION 8: Data handling

2. Answer ALL questions from both SECTIONS.

3. A non-programmable calculator may be used unless otherwise stated.

4. In SECTION A, **circle** the letter of the correct answer. If you change your decision cross out the circled letter and circle your new choice

5. In SECTION B, show all necessary steps in your working unless otherwise stated.

6. When answering questions, candidates must apply their knowledge, skills and insight.

7. Number the answers correctly according to the numbering system used in this question paper.

8. Write neatly and legibly.

SECTION A

QUESTION 1
ANSWER THIS QUESTION ON ANSWER SHEET A.

Circle the letter of the correct answer from the four possible answers.

1.1 Which of the following numbers is a rational number?

A $\sqrt{-4}$

B 0,141141114

C $\sqrt[3]{-8}$

D π (1)

1.2 Simplify $5{,}6 + 1{,}2 \times 3$

A 9,2

B 20,4

C 41,6

D 204 (1)

1.3 The next term in the sequence 1 ; 1 ; 1 ; 4 ; 1 ; 9 ; 1 ; … , is …

A 1.

B 16.

C 14.

D 10. (1)

1.4 Complete the statement: The expression $\frac{2x+5}{3} \times \frac{4x+1}{7}$ has … terms.

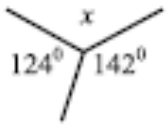
A 1

B 4

C 2

D 5 (1)

1.5 The value of x in the figure below is:



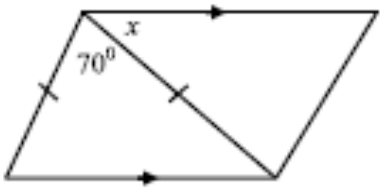
A 38^0

B 56^0

C 94^0

D 90^0 (1)

1.6 The value of x is:



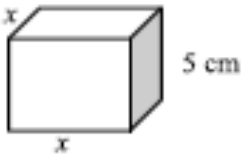
A 70^0

B 110^0

C 30^0

D 55^0 (1)

1.7 The volume of the given prism is:



A $5x^2cm^3$

B $5x^2cm^2$

C $10x\ cm^3$

D $(2x+5)cm^3$ (1)

1.8 If the perimeter of a square is 20 cm, then the area of the square is equal to:

A $400\ cm^2$

B $25\ cm^2$

C $5\ cm^2$

D $100\ cm^2$ (1)

1.9 The median of a set of data is the:

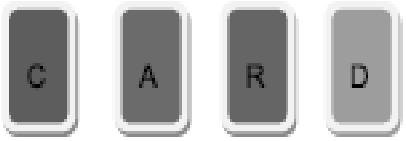
A Biggest number – smallest number

B Middle number

C Most common number

D Average of the data (1)

1.10 In how many ways can you arrange the four cards side by side as shown below?



A 32

B 24

C 16 (1)

D 8

[10]

SECTION B

QUESTION 2

2.1 An amount of R15 000 is invested for 5 years at compound interest of 8% per annum.

2.1.1 What is the total value of the investment after 1 year? (2)

2.1.2 Calculate the total value of the investment after 5 years. (3)

2.2 Calculate $\sqrt[3]{-64}+(-3)^2$ without using a calculator. (2)

2.3 A recipe needs $\frac{3}{4}$ cups of sugar, $1\frac{1}{2}$ cups of flour and a $\frac{1}{3}$ cup of milk.

Write the ratio of the ingredients in the simplest form. (2)

2.4 A large truck uses 16,5 litres of diesel per 100 kilometres. Calculate how much diesel the truck will need to travel 1 284 km. (3)

[12]

QUESTION 3

3.1 Study the pattern below and answer the questions that follow.

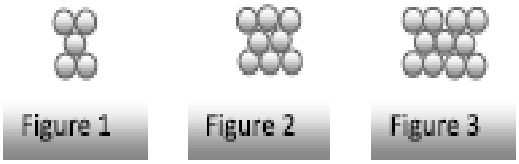


Figure 1 Figure 2 Figure 3

3.1.1 How many balls must be added to draw the next figure? (1)

3.1.2 Draw and complete the table in your answer book.

Figure	1	4	5
Number of balls	5		

(2)

3.1.3 Is the general rule $T_n = 3(n-1)+5$ correct to determine the number of balls for any figure in the pattern? Prove your answer by finding the general rule using the table above. (3)

3.2 Is the following statement correct? Show by calculation to prove your answer.

$(2x-1)^2 = 4x^2+1$ (2)

[8]

QUESTION 4

4.1 Subtract $4x^2-3$ from $-2(2x^2-3x+5)$ (3)

4.2 Simplify.

4.2.1 $-\frac{b^3}{12}(4b-\frac{2ab}{6}+12)$ (3)

4.2.2 $\frac{4x^3-2x(3x^2)}{2x^3}$ (3)

4.3 Factorise fully.

$x(a+y)-(y+a)$ (2)

4.4 Solve the following equations.

4.4.1 $2(x+2)-(x-3)=5$ (4)

4.4.2 $\frac{2x}{x+1}+\frac{2x}{1-x}=\frac{1}{x^2-1}$ (5)

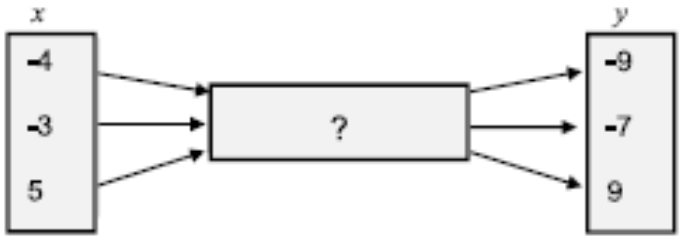
4.4.3 $10^x=0{,}0001$ (2)

4.5 The sum of three consecutive even numbers is 78. Determine the three numbers. (5)

[27]

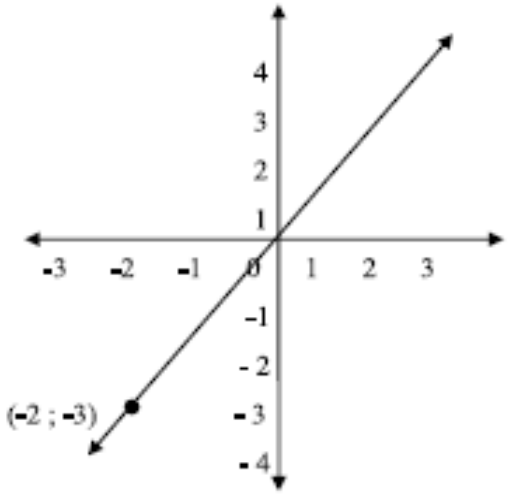
QUESTION 5

5.1 Determine the rule for the following flow diagram.



(2)

5.2 Calculate the gradient of a line through the points (0 ; 0) and (-2 ; -3).



(2)

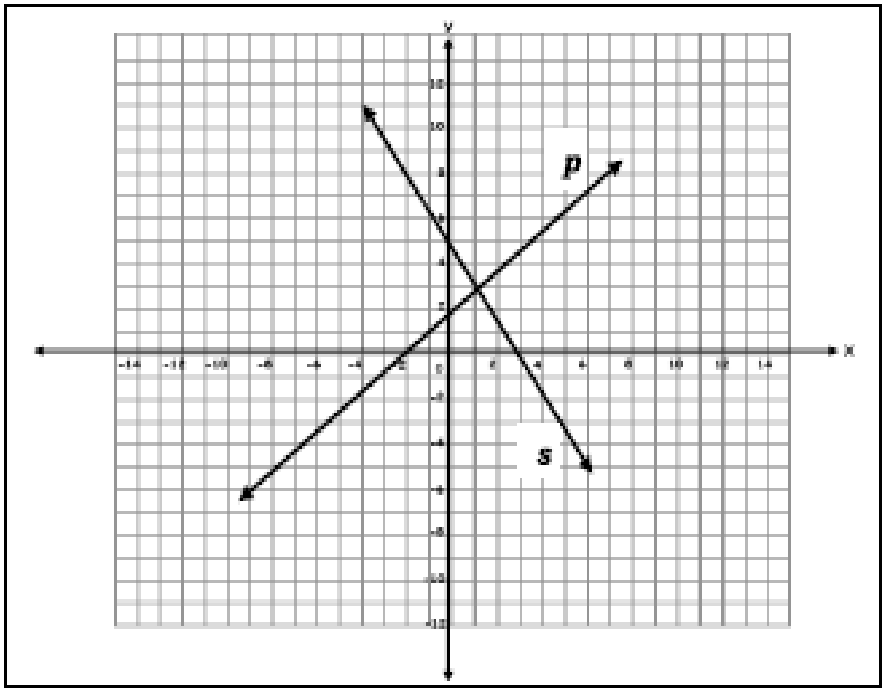
5.3 The equation $y-1=2(x-2)$ defines a straight line graph.

5.3.1 Write down the y-intercept of the graph. (1)

5.3.2 Calculate the x-intercept of the graph. (3)

5.3.3 Draw the graph in your answer book. (2)

5.4 Study the graph below and answer the questions that follow.



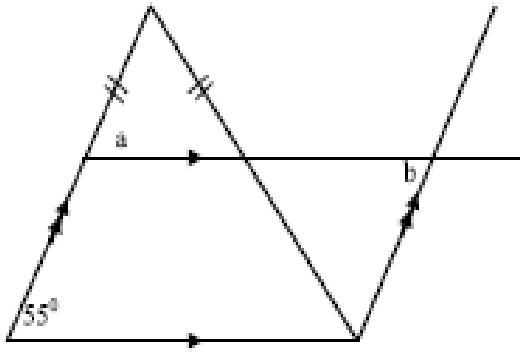
5.4.1 Which of the two graphs, p or s has a positive gradient? Explain. (2)

5.4.2 The equation of p is $y = x + 2$. If $p \perp s$ and the $y-$intercept of s is the point $(0\ ;\ 5)$, determine the equation of s. (2)

[14]

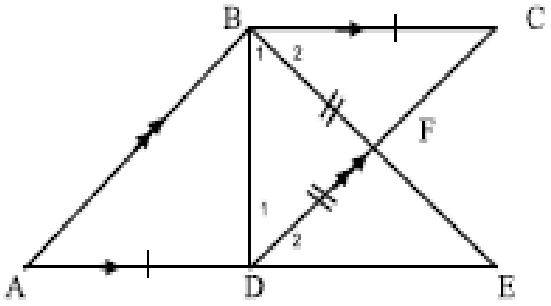
QUESTION 6

6.1 Determine with reasons, the sizes of angles a and b in the diagram below.



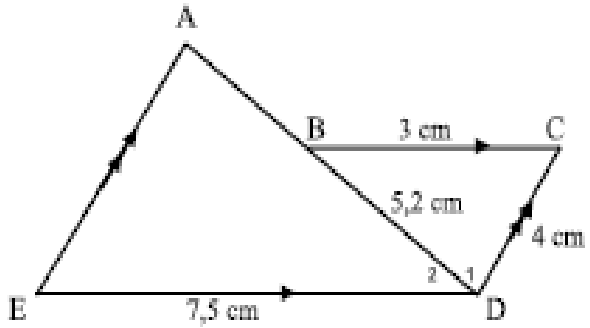
(4)

6.2 AB = BE and BF = FD. Prove that DC = BE.



(4)

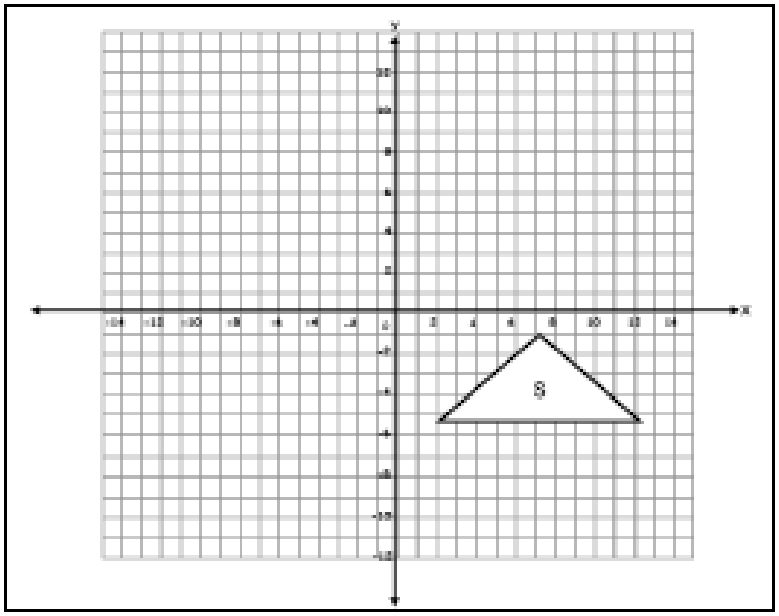
6.3 Study the diagram below and answer the questions that follow.



6.3.1 Prove that ΔAED /// ΔDCB. (6)

6.3.2 Hence, find the length of AD. (4)

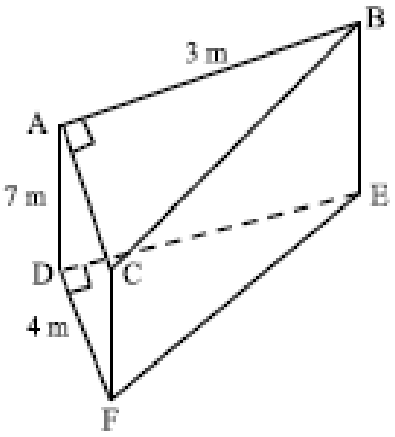
6.4 Draw the image of Δ S after a rotation of 90^0 anticlockwise about the origin O (0 ; 0).
Use ANSWER SHEET B to answer this question.



(3)
[21]

QUESTION 7

7.1 Study the prism below and answer the questions that follow.

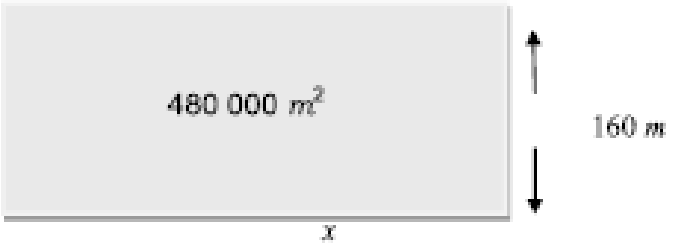


7.1.1 Find the length of BC. (4)

7.1.2 Draw the net of the prism in your answer book. (1)

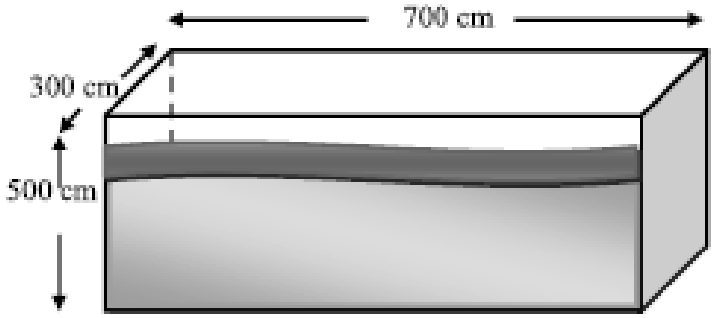
7.1.3 Calculate the surface area of the prism. (3)

7.2 A field, 480 000 m^2 is 160 m wide. What length of fencing is needed to fence it?



(4)

7.3 A rectangular fish tank with an open top is shown below.



7.3.1 Calculate the volume of the tank. (2)

7.3.2 How many litres of water do we need to fill the tank? (2)

[16]

QUESTION 8

8.1 A set of data below are marks obtained by Grade 9 learners in one of their Mathematics tests. The test was out of 50 marks.

4 , 12 , 16 , 8 , 16 , 24 , 32 , 12 , 24 , 36 , 48 , 16 , 32 , 48

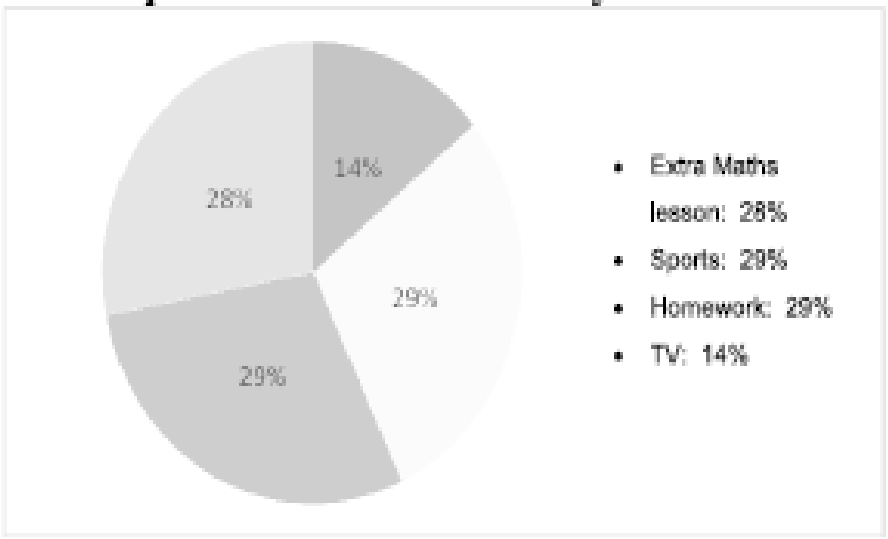
8.1.1 Calculate the mean and median of the data. (3)

8.1.2 What is the mode? (1)

8.1.3 Calculate the range. (1)

8.2 The chart below represents Sipho's daily activities after school from Monday to Friday of each week. He has seven hours daily to run all these activities.

Sipho's after school activity schedule



8.2.1 On which activity does he spend the most of his time? How many hours does he spend on this activity? (2)

8.2.2 On which activity does he spend the least time? How many hours does he spend on this activity? (2)

8.3 Two red, one white and three blue marbles are put into a bag. If you put your hand once into the bag without looking and pull out one marble, what is the probability of:

8.3.1 Pulling out a blue marble? (2)

8.3.2 Not pulling out a white marble? (1)
[12]

TOTAL: 120

FORMULA SHEET

Simple Interest:	Compound Interest:
$I = \frac{Prn}{100}$ $A = P(1 + in)$ $A = P(1 + \frac{rn}{100})$	$A = P(1 + i)^n$ $A = P(1 + \frac{r}{100})^n$

	Perimeter	Area
Square	$4(l)$	l^2
Rectangle	$2(l + b)$	$l \times b$
Circle	$2\pi r$	πr^2
Triangle	$(s1 + s2 + s3)$	$\frac{1}{2} b \times\perp h$
Parallelogram	$2(b + l)$	$b \times\perp h$
Trapezium	Sum of the 4 sides	$\frac{1}{2}(a + b) \times\perp h$ a and b = parallel lines
Rhombus	$4l$	$b \times\perp h$
Kite	$2(a + b)$ a and b = length of equal sides	$\frac{1}{2} \times d_1 d_2$ d_1 and d_2 = diagonals

ANSWER SHEET A

Name: _____ Grade: 9 _____

SECTION A

Marks: ___
10

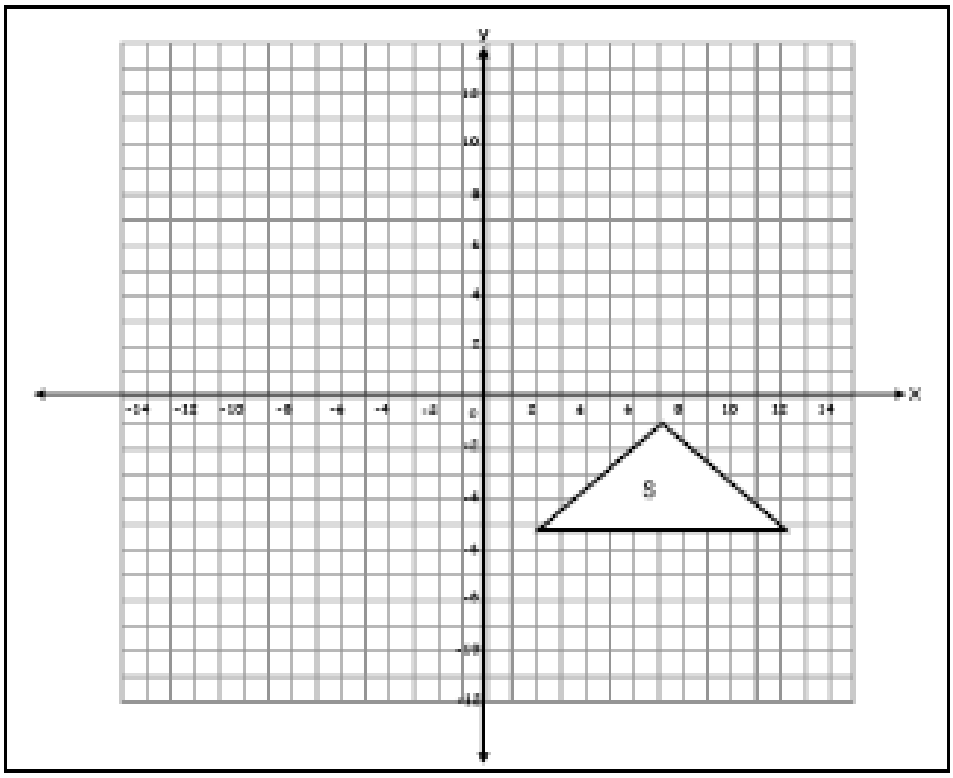
Circle the letter of the correct answer. **Submit this with your answer book.**

Question	Answer			
1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D
1.4	A	B	C	D
1.5	A	B	C	D
1.6	A	B	C	D
1.7	A	B	C	D
1.8	A	B	C	D
1.9	A	B	C	D
1.10	A	B	C	D

ANSWER SHEET B

NAME: _____ **GRADE: 9** ____

QUESTION 6.4



Grade 9 Examination Exemplar Memo 3

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

MATHEMATICS

SECTION A

QUESTION 1

1.1	C
1.2	A
1.3	B
1.4	A
1.5	C
1.6	D
1.7	A
1.8	B
1.9	B
1.10	B

[10]

SECTION B

QUESTION 2

2.1 2.1.1 $P = A(1+i)^n$ ✓ (3)

$= 15000\ (1+0{,}08)^1$ ✓

$= R16200$ ✓

2.1.2 $P = A(1+i)^n$ ✓

$= 15000\ (1+0{,}08)^5$ ✓

$= R22039{,}92115 \approx R22039{,}92$ ✓ (3)

2.2 $\sqrt[3]{-64}+(-3)^2$

$=-4+9$ ✓

$=5$ ✓ (2)

2.3 $\frac{3}{4}:1\frac{1}{2}:\frac{1}{3}$

$\frac{3}{4}:\frac{3}{2}:\frac{1}{3}$ ✓

9 : 18 : 4 ✓ (2)

2.4 $\frac{16,5l}{100km}=\frac{xl}{1284km}$ ✓

$100x = 21186$ ✓

$x = 211,86$ ✓ (2)

[12]

QUESTION 3

3.1 3.1.1 3 Balls ✓ (1)

3.1.2

Figure	1	4	5
Number of balls	5	14✓	17✓

(2)

3.1.3 Yes. ✓
Difference is 3
$T_n = 3n+2$ ✓
$3(n-1)+5=3n-3+5=3n+2$ ✓ (3)

3.2 $(2x-1)^2=4x^2+1$

LHS $=(2x-1)(2x-1)$

$=4x^2-4x+1$✓

Not correct / $4x^2+1\neq 4x^2-4x+1$✓ (2)

[8]

QUESTION 4

4.1 $-2(2x^2-3x+5)-(4x^2-3)$

$=-4x^2+6x-10-4x^2+3$ ✓✓

$=-8x^2+6x-7$ ✓ (3)

4.2 4.2.1 $-\frac{b^3}{12}(4b-\frac{2ab}{6}+12)$

$=-\frac{b^4}{3}$ ✓ $+\frac{ab^4}{36}$ ✓ $-b^3$ ✓ (3)

4.2.2 $\frac{4x^3-2x(3x^2)}{2x^3}$

$=\frac{4x^3-6x^3}{2x^3}$ ✓

$=\frac{-2x^3}{2x^3}$ ✓

$=-1$ ✓ (3)

4.3 $x(a+y)-(y+a)$

$=x(a+y)-(a+y)$ ✓

$=(a+y)(x-1)$ ✓ (2)

4.4 4.4.1 $2(x+2)-(x-3)=5$

$2x+4-x+3=5$ ✓✓

$x+7=5$ ✓

$x=-2$ ✓ (4)

4.4.2 $\frac{2x}{x+1}+\frac{2x}{1-x}=\frac{1}{x^2-1}$

$\frac{2x}{x+1}-\frac{2x}{x-1}$ ✓ $=\frac{1}{(x-1)(x+1)}$ ✓

$2x(x-1)-2x(x+1)=1$

$2x^2-2x$ ✓ $-2x^2-2x$ ✓ $=1$

$-4x=1$

$x=-\frac{1}{4}$ ✓ (5)

4.4.3 $10^x = 0{,}0001$

$10^x = 10^{-4}$ ✓

$x = -4$ ✓ (2)

4.5 Let the first number be $2x$, then the second is $2x+2$ and third $2x+4$

$\therefore 2x+2x+2+2x+4=78$ ✓

$6x+6=78$

$6x=78-6$

$\frac{6x}{6}=\frac{72}{6}$

$x=12$ ✓

$\therefore$ the numbers are 24 ✓, 26 ✓and 28 ✓ (5)

[27]

QUESTION 5

5.1 $y=2x-1$ ✓✓ (2)

5.2 $m=\frac{y_2-y_1}{x_2-x_1}$ OR $m=\frac{\Delta y}{\Delta x}$ ✓ $=\frac{3}{2}$ ✓

$m=\frac{-3-0}{-2-0}$ ✓

$=\frac{3}{2}$ ✓ (2)

5.3 The equation $y-1=2(x-2)$ defines a straight line graph.

5.3.1 $y-intercept=-3$ (1)

5.3.2 $y-1=2(x-2)$

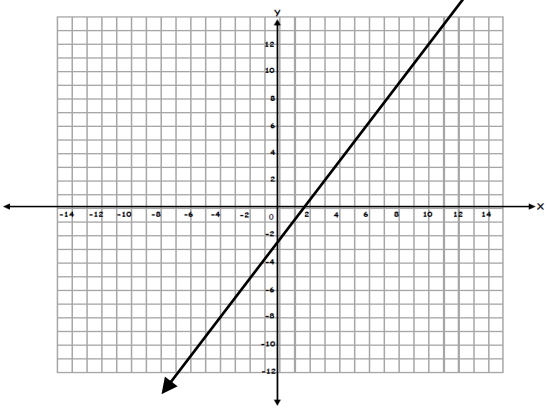
$0-1=2(x-2)$ ✓

$0-1=2x-4$

$3=2x$ ✓

$x=\frac{3}{2}$ ✓ (3)

5.3.3



✓✓ *(1 mark for each intercept)*

(2)

5.4 5.4.1 ***p***. ✓ Increasing graph **OR** when x increases, y also increases **OR** x and y are directly proportional ✓ (2)

5.4.2 $y=-x$ ✓ $+5$ ✓ (2)

[14]

QUESTION 6

6.1 a = 55^0 ✓ [corresponding angles of parallel lines] ✓

b = 55^0 ✓ [opposite angles of a parallelogram] ✓ (4)

6.2 AB = BE [given] ✓

AB = DC ✓ [opposite sides of a parallelogram ✓]

∴ DC=BE ✓ [both = AB] ✓ (4)

6.3.1 In ΔDCB and ΔAED

$\hat{D}_1 = \hat{A}$ ✓ [alternate angles; DC // AE] ✓

$\hat{B} = \hat{D}_2$ ✓ [alternate angles; BC // DE] ✓

$\therefore \hat{C} = \hat{E}$ ✓ [interior angles of a triangle] ✓

∴ ΔDCB /// ΔAED [AAA] (6)

6.3.2 $\frac{AD}{DB} = \frac{ED}{CB}$ ✓

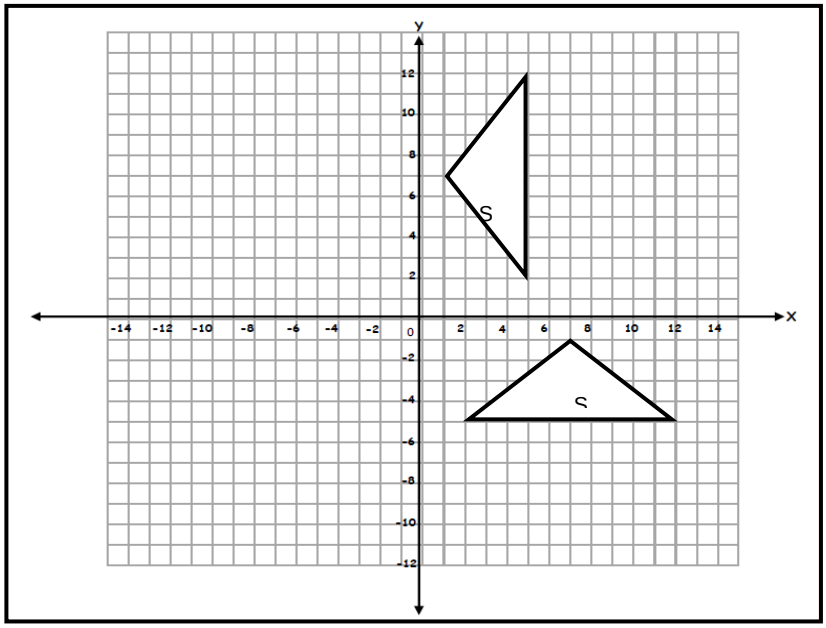
$\frac{AD}{5{,}2\text{ cm}} = \frac{7{,}5\text{ cm}}{3\text{ cm}}$ ✓

AD = 13 cm ✓

∴ AB = 13 cm – 5,2 cm

= 7,8 cm ✓ (4)

6.4



✓✓✓ (*1 mark for each vertex of the image*) (3)

[21]

QUESTION 7

7.1 7.1.1 Find the length of BC.

$BC^2 = AB^2 + AC^2$

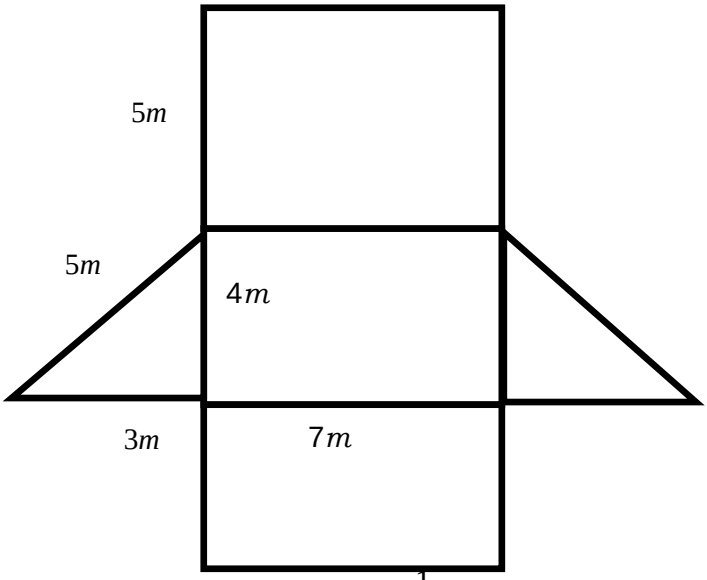
$= (3\,cm)^2 + (4\,cm)^2$ ✓

$= 9\,cm^2 + 16\,cm^2$ ✓

$= 25\,cm^2$ ✓

$BC = 5\,cm$ ✓ (4)

7.1.2



(1)

7.1.3 Surface Area = $(5\ m \times 7\ m) + (4\ m \times 7\ m) + 2(\frac{1}{2} \times 4 \times 3) + (3\ m \times 7\ m)$ ✓

$= 35\,m^2 + 28\,m^2 + 12\,m^2 + 21\,m^2$ ✓

$= 96\ m^2$ ✓ (3)

7.2

$160m \times x = 480\,000\ m^2$ ✓

$160xm = 48\,0000\ m^2$

$x = \frac{48\ 0000\ m^2}{160\ m}$

$x = 3000\,m$ ✓

Length needed = $2(160\,m + 3\,000\,m)$ ✓

$= 6\ 320\ m$ ✓ (4)

7.3 7.3.1 $V = 300\,cm \times 500\,cm \times 700\,cm$ ✓

$= 105\,000\,000\,cm^3$ ✓ (2)

7.3.2 Amount of water = $\frac{105\ 000\ 000\ cm^3}{1\,000}$ ✓

$= 105000\ l$ ✓ (2)

[16]

QUESTION 8

8.1.1 4 , 8 , 12 , 12 , 16 , 16 , **16 , 24** , 24 , 32 , 32 , 36 , 48 , 48 ✓

Median $= \frac{16+24}{2}$ ✓

$= 20$ ✓ (3)

8.1.2 16 ✓ (1)

8.1.3 Range = 48 – 4 = 44 ✓ (1)

8.2 8.2.1 Both homework and sports. ✓ 2 Hours each OR 4 Hours altogether ✓ (2)

8.2.2 Watching TV. ✓ 1 Hour. ✓ (2)

8.3 8.3.1 P(B) = $\frac{3}{6}$ ✓= $\frac{1}{2}$ ✓ (2)

8.3.2 P(Not W) = $\frac{5}{6}$ ✓ (1)

[12]

TOTAL: 120

Grade 9 Examination Exemplar 4

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

MATHEMATICS	GRADE 9	88

Instructions:

1. This paper consists of 12 pages including the cover page.
2. Read the questions carefully before answering.
3. Answer all questions.
4. Show all your calculations.
5. Question 1 consists of 10 multiple choice questions. Answer question 1 by writing the correct letter next to the question number.
6. You may use an approved scientific calculator (non-programmable and non-graphical).

QUESTION 1 **MARKS: 10**

1.1 Which ONE of the following numbers is an irrational number?

A. $\sqrt{21}$ B. $-\frac{3}{5}$

C. $\sqrt[3]{-8}$ D. $0,\dot{7}$ (1)

1.2 Which number is missing in the following number pattern?

$\frac{1}{2}; .....; \frac{1}{18}; \frac{1}{54}; \frac{1}{162}$

A. $\frac{1}{8}$ B. $\frac{1}{6}$

C. $\frac{1}{9}$ D. $\frac{1}{12}$ (1)

1.3 Complete: $-(-3)^3$ = ...

A. 6 B. 9

C. -27 D. 27 (1)

1.4 Which of the following numbers lies between 0,07 and 0,08?

A. 0,00075 B. 0,0075

C. 0,075 D. 0,75 (1)

1.5 Which of the numbers below is 0,000065 written in scientific notation?

A. $0,65 \times 10^{-5}$ B. $7,0 \times 10^{-5}$

C. $6,5 \times 10^{-5}$ D. 65×10^{-5} (1)

1.6 At which of the points below will the straight line graph defined by $3y+2x+1=0$ cut the x-axis?

A. (-2; 0) B. $(-\frac{1}{2};0)$

C. $(-3; -\frac{1}{3})$ D. $(-\frac{1}{3};0)$

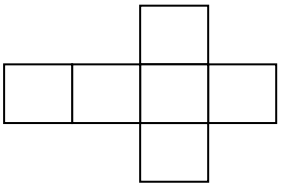
(1)

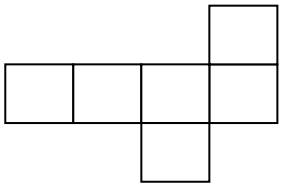
1.7 Which one of the following is **not** a platonic solid?

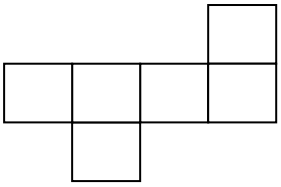
A. Regular Tetrahedron B. Octahedron

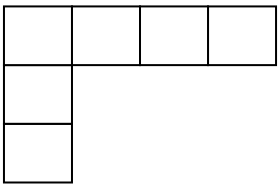
C. Square pyramid C. Cube (1)

1.8 Which one of the following is **not** a net of a hexahedron?

A. 

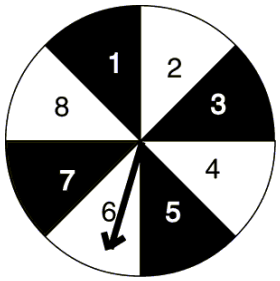
B. 

C. 

D. 

(1)

1.9 Using the spinner below, what is the probability of landing on an even number ?



A. $\frac{1}{8}$

B. 50 %

C. $\frac{1}{5}$

D. 20 %

(1)

1.10 A box contains 3 blue, 4 white and some green marbles of the same size.
If the probability of drawing a white marble from the box is $\frac{1}{3}$, how many green marbles are there in the box?

A. 12

B. 4

C. 5

D. $\frac{5}{12}$

(1)

QUESTION 2 **MARKS: 10**

2.1 Simplify each of the following expressions:

2.1.1 $(a^2b^3)^2 \cdot ab^2$ (2)

2.1.2 $\frac{x-2}{2x} - \frac{x-3}{3x}$ (4)

2.2 Factorise fully:

2.2.1 $7x^2 - 28$ (2)

2.2.2 $6a^3 + 12a^2 - 18a$ (2)

QUESTION 3 **MARKS: 8**

Solve for x:

3.1 $8x - 3 = 3x - 22$ (2)

3.2 $3^{x+1} = 81$ (3)

3.3 $x - \frac{x-1}{2} = 3$ (3)

QUESTION 4 **MARKS: 13**

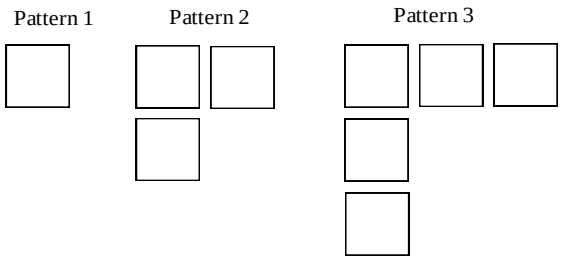
4.1 Write the fourth term in each of the following number patterns:

4.1.1 1; 4; 9; … (1)

4.1.2 2; -4; 8; … (1)

[Recommendations: Give at least 4 terms in each pattern. Make 4.1.1 a bit challenging. For example, 0; 3; 8; 15 (1 less than square numbers)]

4.2 The sequence below shows blocks being arranged to form an L shape.



4.2.1 Copy and complete the table below.

Pattern number	1	2	3	4	5	…..	12
Number of blocks	1	3	5	…..	…..	13	…..

(4)

4.2.2 Write down the general term for the number of blocks per pattern in the form T_n = (2)

4.2.3 Use the answer in 4.2.2 above to calculate the number of blocks in the 100^{th} pattern. (2)

4.3 Calculate the numerical value of $-y^3 + 2y^2 - 3y - 5$ if $y = -3$ (3)

QUESTION 5 **MARKS: 9**

5.1 If 3 kg of potatoes costs R24, how much will 7 kg of potatoes cost? (3)

5.2 Calculate the simple interest on R3 500 invested at 6 % per annum for 3 years. (3)

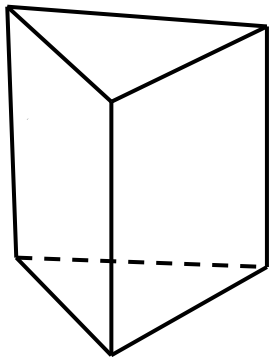
5.3 Calculate what R10 000 will amount to if it is invested at 10 % per annum compound interest for 3 years. (3)

QUESTION 6 **MARKS: 5**

Draw the graphs defined by $y = -2x + 4$ and $x = 1$ on the given set of axes on page 11. Label each graph and clearly mark the points where the graphs cut the axes. (5)

QUESTION 7 **MARKS: 20**

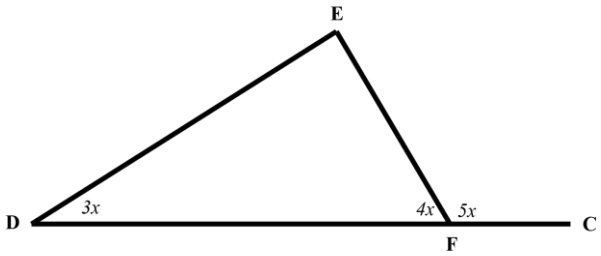
7.1 Use the geometric solid below to complete the table:



Name of the geometric solid	Number of faces	Number of edges	Number of vertices
(a)……..	5	(b)……..	6

(2)

7.2 In ΔDEF, DF is produced to C. Calculate giving reasons

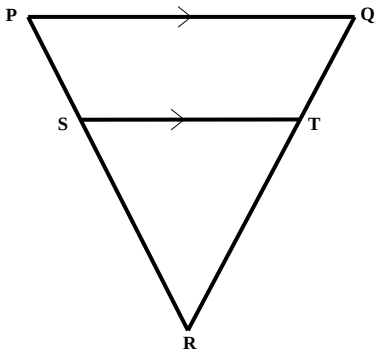


7.2.1 the value of x. (3)

7.2.2 the size of $\hat{E}$ (3)

7.3 Construct A$\hat{B}$C = 15° using a ruler and a pair of compasses only. (i.e without the use of a protractor) (5)

7.4 In ΔPQR , $PQ \parallel ST$, $PR = 10\ cm$, $ST = 3\ cm$ and $SR = 6\ cm$

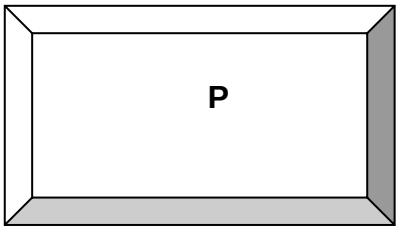


7.4.1 Show that $\Delta PQR|||\Delta STR$ (4)

7.4.2 Calculate length of PQ. (3)

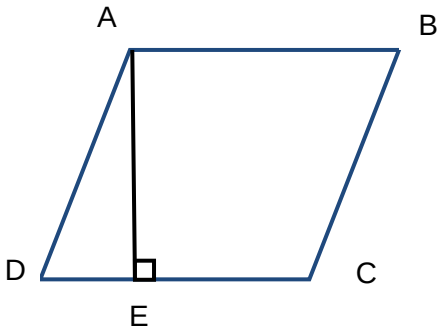
QUESTION 8 **MARKS: 10**

8.1 The diagram below represents a rectangular picture surrounded by a frame 2 cm in width. The perimeter of the frame measured along the outer edge is 50 cm. the length is x cm. Find the area of the picture P in terms of x.



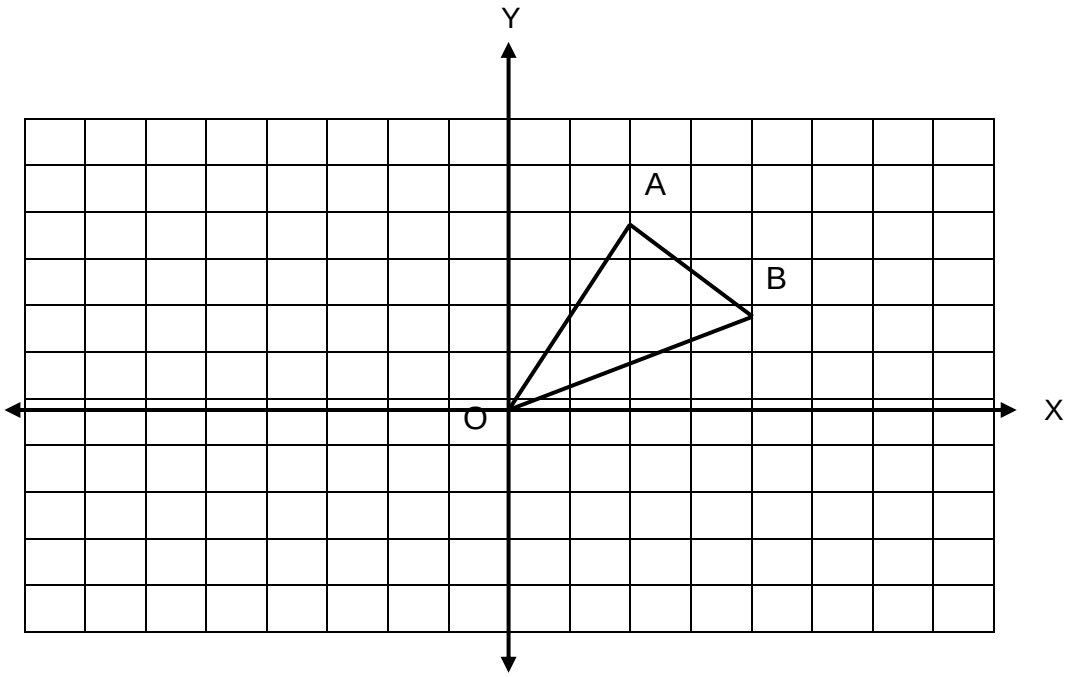
(6)

8.2 ABCD is a rhombus with AB = 4 cm and AE = 3,5 cm .



8.2.1 Determine the perimeter of ABCE correct to 1 decimal place. (4)

QUESTION 9 **MARKS: 5**



9.1 Use the given grid on page 12 to draw $\Delta A'OB'$, the reflection of ΔAOB in the x-axis.

(2)

9.2 Write down the coordinates of B', the image of B. (1)

9.3 On the same grid, draw the rotation of ΔAOB through 180^0 about the origin to form $\Delta A''OB''$. (2)

QUESTION 10 **MARKS: 10**

The stem-and-leaf below shows the number of minutes that each of a group of 41 violin learners practice per day.

Time spent practicing violin

Stem	Leaf
1	5 5 8 8 9
2	1 3 5 5 6 7 8
3	0 1 3 4 5 5 9
4	1 2 3 4 4
5	2 3 7 8 9 9 9 9
6	0 1 5 8 9
7	2 5 7 9

Key: 6 | 2 = 62 minutes

10.1 Use the data to determine the following:

10.1.1 The range. (1)

10.1.2 The mode. (1)

10.1.3 The median. (1)

10.1.4 The mean (average minutes spent practicing violin per day), correct to two decimal places. (2)

10.2 Using the classes (class intervals) 10-19; 20-29; 30-39; etc. Draw a histogram that represent this data. (5)

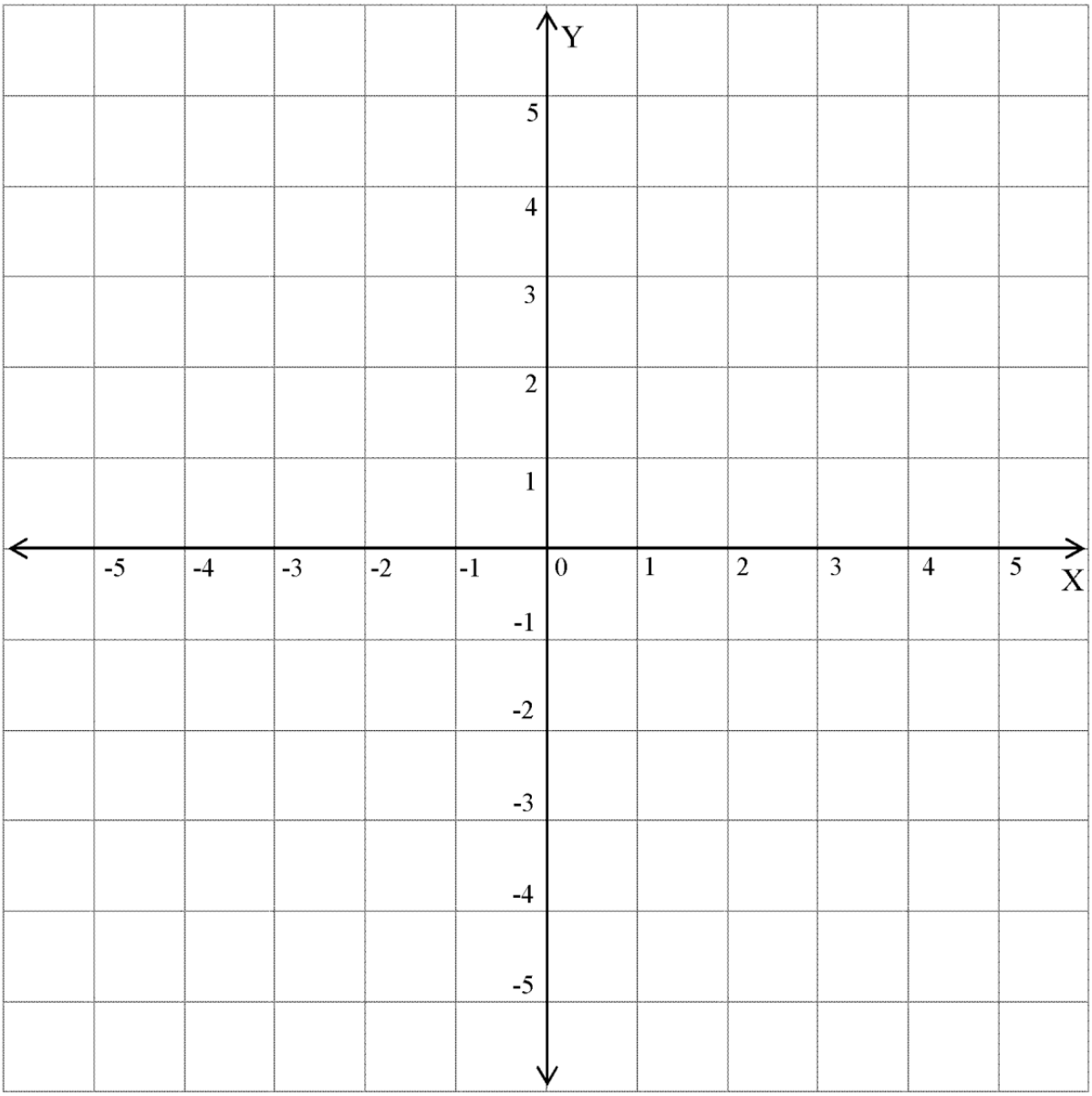
TOTAL = [100]

****

GRID FOR ANSWERING QUESTION 6:

NAME OF A LEARNER: ……. **GRADE: ……**

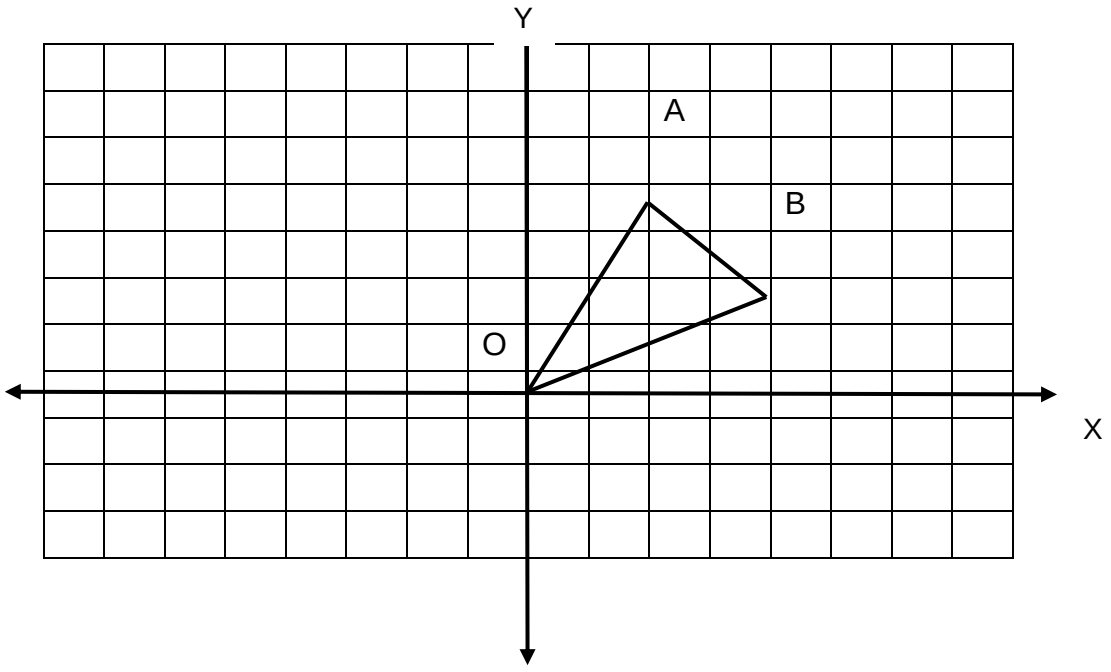
QUESTION 6 **MARKS: 5**



GRID FOR ANSWERING QUESTION 9:

NAME OF A LEARNER: …….. GRADE: ……

QUESTION 9 **MARKS: 5**



Grade 9 Examination Exemplar 4 Memo

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QUESTION 1
MARKS: 10

1.1 A. ✓

1.2 B ✓

1.3 D ✓

1.4 C ✓

1.5 C ✓

1.6 B ✓

1.7 C ✓

1.8 D ✓

1.9 B ✓

1.10 C ✓

(10)

QUESTION 2
MARKS: 10

2.1

2.1.1 $(a^2b^3)^2 \cdot ab^2 = a^4b^6 \cdot ab^2$ ✓

$= a^5b^8$ ✓ (2)

2.1.2 $\frac{x-2}{2x} - \frac{x-3}{3x} = \frac{3(x-2)-2(x-3)}{6x}$ ✓

$= \frac{3x-6-2x+6}{6x}$ ✓

$= \frac{x}{6x}$ ✓

$= \frac{1}{6}$ ✓

(4)

2.2

2.2.1 $7x^2 - 28 = 7(x^2 - 4)$ ✓

$= 7(x - 2)(x + 2)$ ✓ (2)

2.2.2 $6a^3 + 12a^2 - 18a = 6a(a^2 + 2a - 3)$ ✓

$= 6a\,(a - 1)(a + 3)$ ✓ (2)

QUESTION 3
MARKS: 8

3.1 $8x + 3 = 3x - 22$

$5x = -25$ ✓

$x = -5$ ✓ (2)

3.2 $3^{x+1} = 81$
$= 3^4$ ✓
$\therefore x + 1 = 4$ ✓
$x = 3$ ✓
(3)

3.3 $x - \frac{x-1}{2} = 3$
$2x - (x-1) = 6$ ✓
$2x - x + 1 = 6$ ✓
$x + 1 = 6$
$x = 5$ ✓ (3)

QUESTION 4
MARKS: 13

4.1
4.1.1 1; 4; 9; **16**✓ (1)

4.1.2 2; -4; 8; **-16**✓
(1)

4.2

4.2.1

Pattern number	1	2	3	4	5	**7✓**	12
Number of blocks	1	3	5	**7✓**	**9✓**	13	**23✓**

(4)

4.2.2 $T_n = 2n - 1$✓✓

(2)

4.2.3 $T_{100} = 2(100) - 1$✓

$= 200 - 1$

$= 199$✓

(2)

4.3 $-(-3)^3 + 2(-3)^2 - 3(-3) - 5$ ✓ $= 27 + 18 + 9 - 5$✓

$= 49$✓ (3)

QUESTION 5
MARKS: 9

5.1 Let 7 kg cost Rx, then

$$\frac{x}{24} = \frac{7}{3} \checkmark$$

$$x = \frac{(7)(24)}{3} \checkmark$$

$$= R56 \checkmark$$ (3)

5.2 SI $= \frac{P.n.r}{100}$ ✓ $= \frac{(R3500)(3)(6)}{100}$ ✓ = R630 ✓

OR

SI $= P.n.i$ ✓ = (R3 500)(3)(0.06) ✓ = R630 ✓ (3)

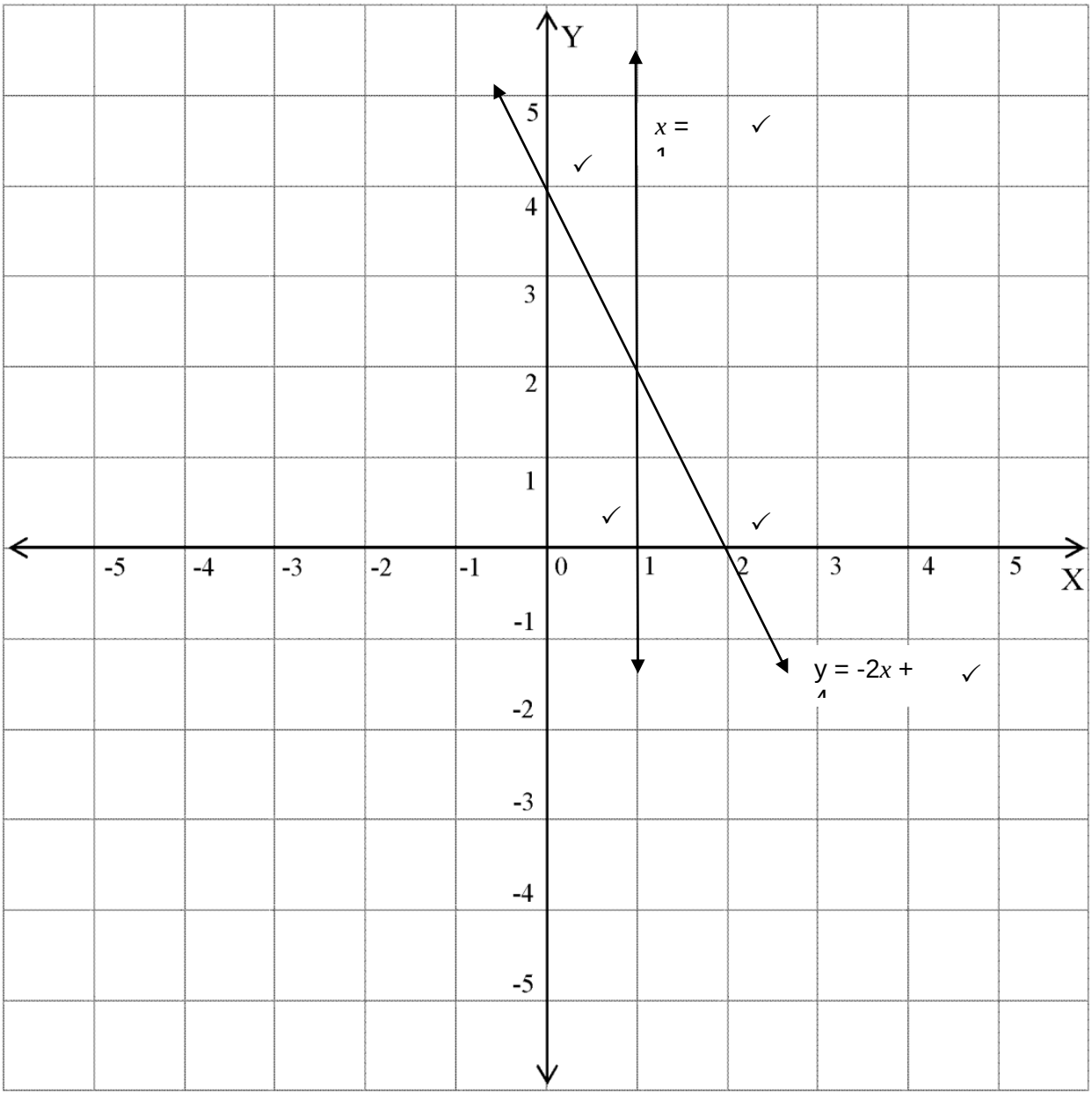
5.3 A = P$(1 + \frac{r}{100})^n$✓ = R10 000$(1 + \frac{10}{100})^3$ ✓= R13 310 ✓

OR

A = P$(1 + i)^n$✓ = R10 000$(1 + 0.1)^3$✓ = R13 310 ✓

(3)

QUESTION 6
MARKS: 5



(5)

One mark for the y-intercept
One mark for each x-intercept
One mark for labeling each graph

QUESTION 7
MARKS: 20

7.1 (a) Triangular prism ✓
(1)
(b) 9 ✓ (1)

7.2

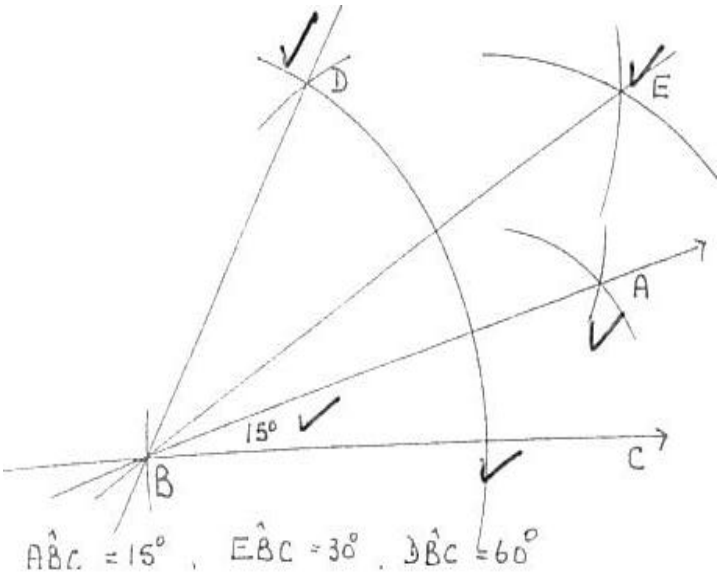
7.2.1 $4x+5x=180^0$ DFC is a line ✓ Or adj. $< s$ on a str. line
$9x=180^0$ ✓
$x=20^0$ ✓ (3)

7.2.2 $\hat{E} = 5x-3x$ ✓ ext. < of a Δ = Sum of int. opp. $< s$ ✓
$=2x$
$= 2(20^0)$
$=40^0$ ✓ (3)

OR

$\hat{E} = 180^0 - 7x$ ✓ Sum of $< s$ of ΔDEF ✓
$= 180^0 - 140^0$
$= 40^0$ ✓

7.3



(5)

7.4

7.4.1 In ΔPQR and ΔSTR
$\hat{P}$ = $\widehat{RST}$ corr. $< s$,PQ//ST ✓
$\hat{Q}$ = $\widehat{RTS}$ corr. $< s$,PQ//ST ✓
$\hat{R}$ = $\hat{R}$ common ✓
∴ ΔPQR|||ΔSTR <<< ✓
(4)

7.4.2 $\frac{PQ}{ST} = \frac{PR}{SR}$ prop. Sides of similar Δs ✓ Or $\Delta PQR|||\Delta STR$

$$PQ = \frac{PR.ST}{SR}$$

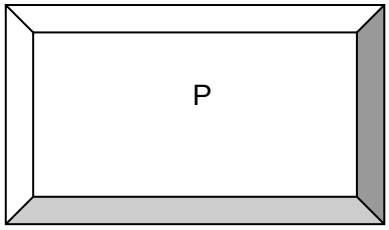
$$= \frac{(10cm)(3cm)}{6cm} \checkmark$$

$$= 5\ cm \checkmark$$

(3)

QUESTION 8
MARKS: 10

8.1



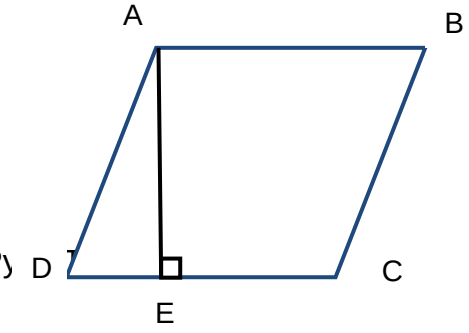
The perimeter of the frame = 50 cm

∴ length + breath = 25 cm ✓

∴ Length = x and breadth = 25 – x ✓

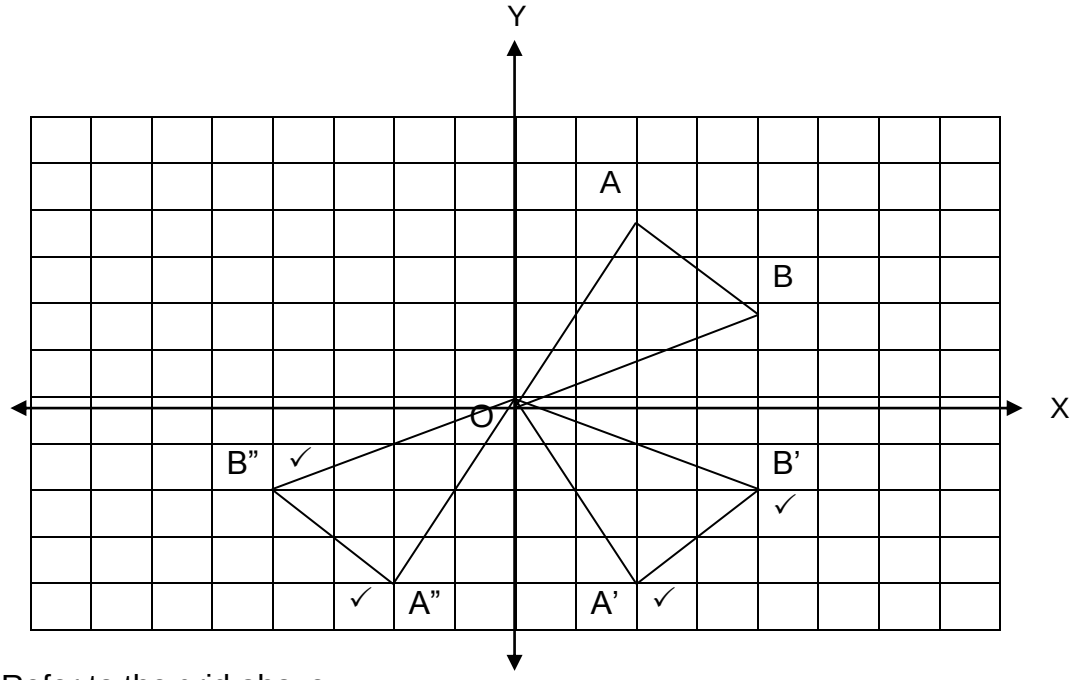
Picture: Length = x – 4 cm✓ and breadth = 21 – x cm ✓
Therefore area of picture: = (x – 4)(21 – x) cm^2 ✓ = - x^2 + 25 x – 84 cm^2 ✓
(6)

8.2



$DE^2 = AD^2 - AE^2$ (Py
$= 16 - 3{,}5^2$
$= 16 - 12{,}25$
$= 3{,}75$ ✓
Therefore DE = $\sqrt{3{,}75}$
$= 1{,}94$ ✓
CE = 4 cm - 1,94 = 2,06
Perimeter of ABCE = 4 cm + 4 cm + 2,06 cm+ 3,5 cm
= 13,56 ≈ 13,6 cm ✓ (4)

QUESTION 9
MARKS: 5



9.1 Refer to the grid above. (2)

9.2 B' (4;-2) ✓

(1)

9.3 Refer to the grid above. (2)

QUESTION 10
MARKS: 10

10.1

10.1.1 Range = 79 – 15 = 64 ✓ (1)

10.1.2 Mode = 59 ✓
(1)

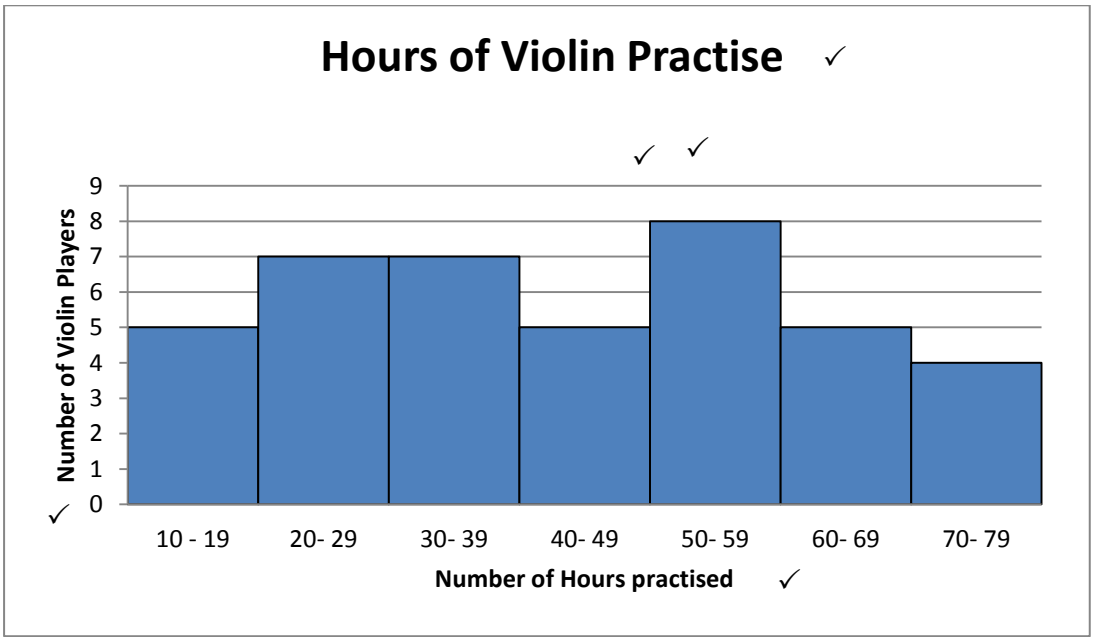
10.1.3 Median = 42 ✓ (1)

10.1.4 Mean(Average) = $\frac{\sum x}{n}$

$= \frac{1793}{41}$ ✓

= 43.73 ✓ (2)

10.2



One mark for the heading One mark for each axis Two marks for the histogram if all bars are correct

(5)

****

Consider using class boundaries for the histogram to show that time is continuous. Lower class values may also be used

Grade 9 Examination Exemplar 5

GAUTENG PROVINCE
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INSTRUCTIONS AND INFORMATION (2017)

Read the following instructions carefully before answering the questions.

1. This question paper consists of 8 questions and 19 pages, including the attached FORMULA SHEET.

2. Answer ALL questions.

3. A non-programmable calculator may be used unless otherwise stated.

4. Clearly show all calculations, diagrams and graphs that you have used in determining your answers. Answers only will not necessarily be awarded full marks.

5. If necessary, round-off answers to 2 decimal places, unless otherwise stated.

6. Diagrams are not necessarily drawn to scale. Reasons MUST always be given when doing geometry calculations.

7. Number your answers correctly according to the numbering system used in this question paper.

8. Answer Questions 2 to 8 in the spaces provided.

9. Write neatly and legibly.

QUESTION 1 [10]

Answer the following questions by choosing the correct answer. Circle the LETTER of the correct answer.

1.1 Perpendicular lines are two straight lines that form a _____ angle when they meet or intersect each other.

A 180°

B 360°

C 90°

D 45° (1)

1.2. $\frac{(ab^2c)^3(2a^2)^2}{2a^5(b^3c^2)^2}$

A $\frac{2a^2}{2}$

B $\frac{4ab}{c^2}$

C $\frac{2ab}{c^2}$

D $\frac{2a^2}{c}$ (1)

1.3. The next term in the pattern 7; 1; -5; -11 will be:

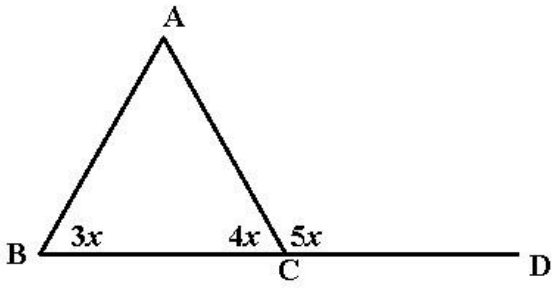
A 17

B -17

C -22

D 16 (1)

1.4 In ΔABC, BC is produced to D. The size of A in terms of x is…



A 2*x*

B 12*x*

C 7*x*

D 9*x* (1)

1.5 Which of the following numbers is irrational?

A 0, 2

B $0,\dot{5}$

C $\sqrt{5}$

D $\sqrt{6\frac{1}{4}}$ (1)

1.6 A circle has a diameter of 6 cm. The area of a quarter circle is___ cm^2.

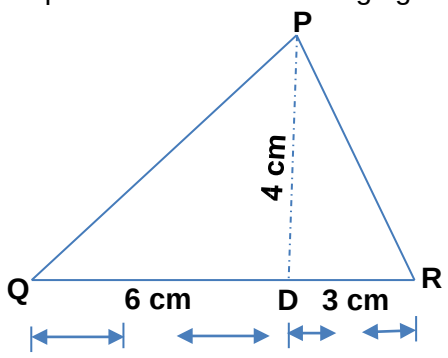
A 36π

B 9π

C $\frac{9}{4}\pi$

D $\frac{9}{2}\pi$ (1)

1.7 The perimeter of the following figure in cm is:



A 20 cm

B 21,21 cm

C 9 cm

D 5 cm (1)

1.8 Bonga covers a distance of 3,375 km in 45 minutes. The speed she travels at will be:

A 60 km/h

B 4,5 km/h

C 120 km/h

D 2,53 km/h (1)

1.9 The straight line graph defined by $y = 2x - 4$ will cut the y-axis at:

A (0;4)

B (-4;2)

C (0;-4)

D (2; -4) (1)

1.10 In a bag there are 8 red balls, 6 blue balls, 2 white balls and 4 green balls. The percentage probability of drawing a red ball is:

A 80%

B 60%

C 40%

D 20% (1)

QUESTION 2 [20]

2.1 Simplify the following:

2.1.1 $\frac{1}{2}(a+b)-4a\left(\frac{1}{4}\right)-b$

(3)

2.1.2 $\frac{4}{x-5}+\frac{3}{x-2}$

(3)

2.1.3 $\frac{x^2+x-2}{x-1}\div\frac{x^2+2x}{4}$

(4)

2.2 Factorise fully:

2.2.1 $24xy-16x^2y+8xy^2$

(2)

2.2.2 $x^2(x-3)-4(x-3)$

(3)

2.3 Solve for *x*:

2.3.1 $4(x+2)=16+2(x-1)$

(3)

2.3.2 $3^x = \frac{1}{27}$

(2)

QUESTION 3 [13]

3.1 Sihle wants to buy a bicycle that costs R799,00. He cannot afford to pay the full amount all at once, so the seller allows him to pay R79,90 now as a deposit and pay the rest over 3 years at 20% p.a.

3.1.1 Calculate the amount that he still needs to pay, after he has paid the deposit.

(1)

3.1.2 What interest amount does he need to pay on the remainder?

(3)

3.1.3 What is the total amount that Sihle still has to pay?

(2)

3.1.4 How much must he pay every month for the bike for the next 3 years?

(2)

3.1.5 How much would have been paid altogether for the bicycle at the end of 3 years?

(2)

3.2 Biltong is sold at R21,50 per kilogram. Complete the table below:

Amount of biltong	Amount paid	Change in rands
2 kg	R50,00	R7,00
A	R40,00	R18,50
500 g	**B**	R4,25
3,5 kg	R200,00	**C**

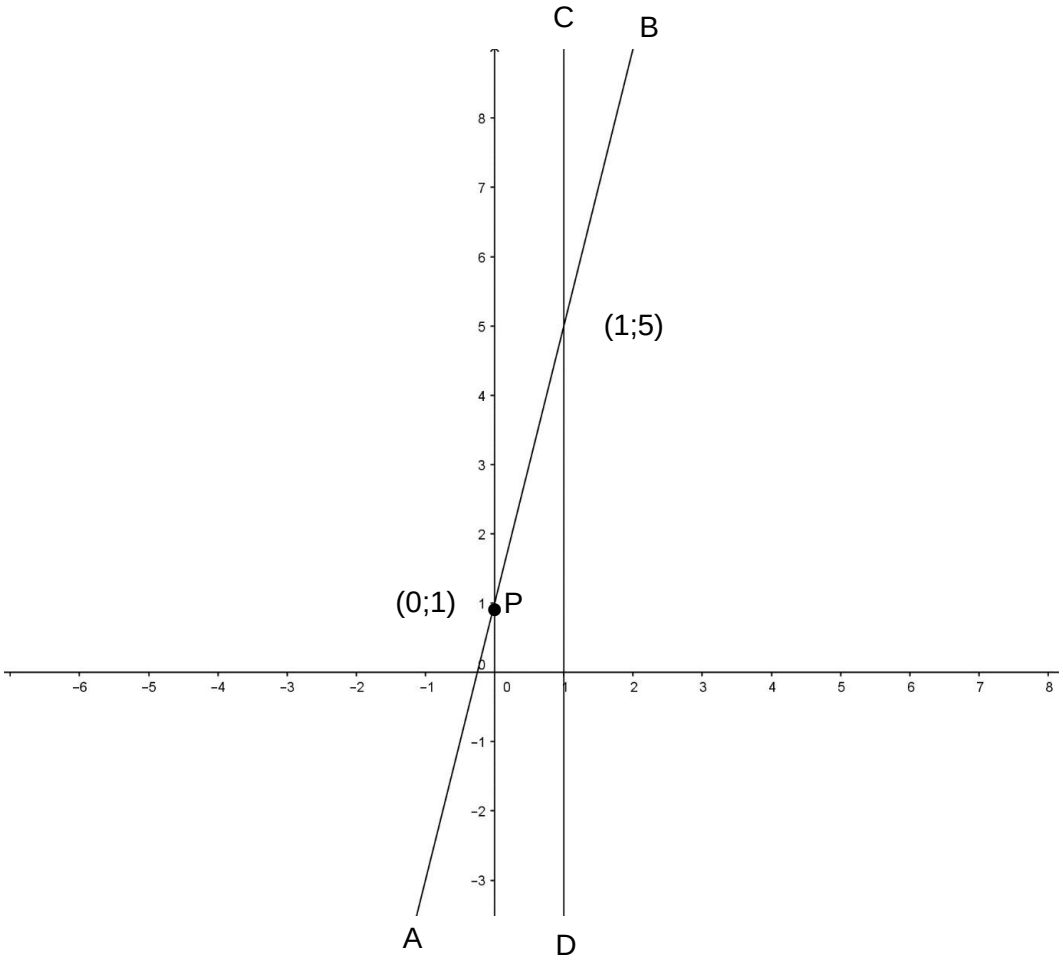
A

B

C (3)

QUESTION 4 [4]

4.1 Study the following graphs and answer the questions that follow.



4.1.1 Calculate the gradient of line AB, you may use the given formula:
$m = \frac{y_2 - y_1}{x_2 - x_1}$

(2)

4.1.2 Find the equation of line AB in the form: $y = mx + c$.

(2)

QUESTION 5 **[10]**

5.1 Study the diagram pattern below. Complete the table for figures 4 and 5.

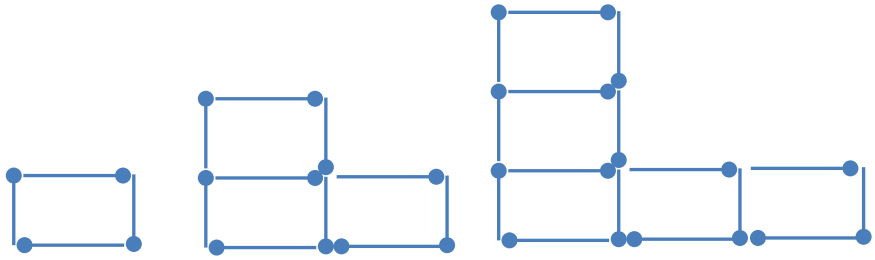


FIGURE 1 **FIGURE 2** **FIGURE 3**

FIGURE	1	2	3	4	5
NUMBER OF MATCHSTICKS	4	10	16		

(2)

5.2 Describe the pattern in your own words.

_____

_____

_____ (1)

5.3 Determine the rule of the pattern in terms of T*n*.

_____

_____

_____ (2)

5.4 Determine the 10^{th} term.

_____

_____

_____ (2)

5.5 Which term of the sequence is equal to 76?

_____

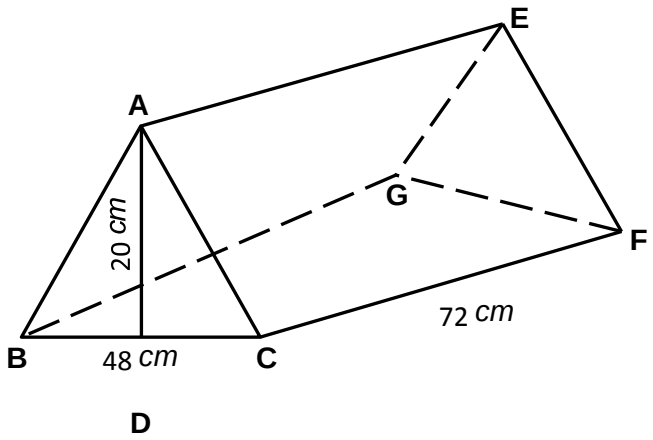
_____

_____ (3)

[8]

QUESTION 6

In the triangular prism below, AB = AC = 25cm and AD ⊥ BC



Calculate:

6.1 Volume of the prism

_____

_____

_____ (2)

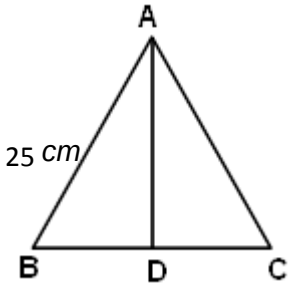
6.2 Surface Area of the prism

_____

_____

_____ (3)

6.3 In the triangle below, BC = 48 cm and BD = DC. Show that AD = 7 cm.



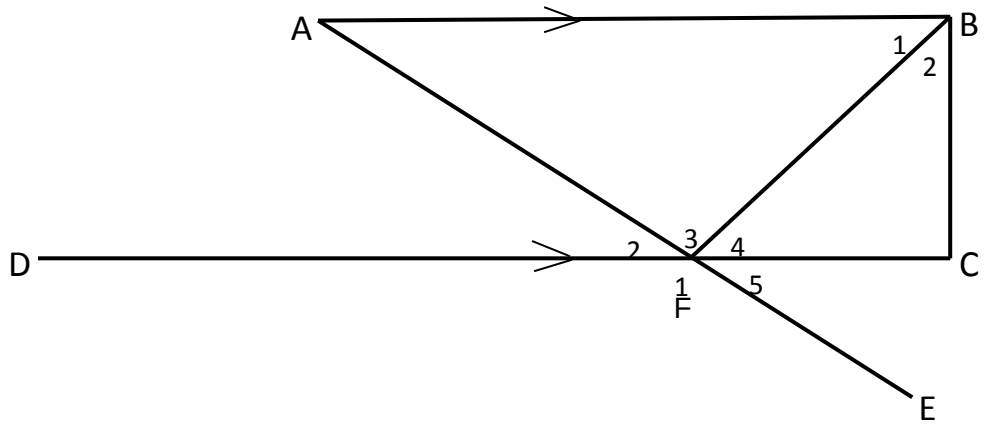
_____

_____

_____ (3)

QUESTION 7 [24]

7.1 Given: AB // CD



Complete the statement and give suitable reasons.

	Statement	Reasons
7.1.1	$\hat{F}_2 = \hat{F}_5$	
7.1.2	$\hat{B}_1$ =	Alternate angles
7.1.3	$\hat{C}$ $\hat{B}$ + A C= °	
7.1.4	If $\hat{B}_2$ = $\hat{F}_4$ then BC =	

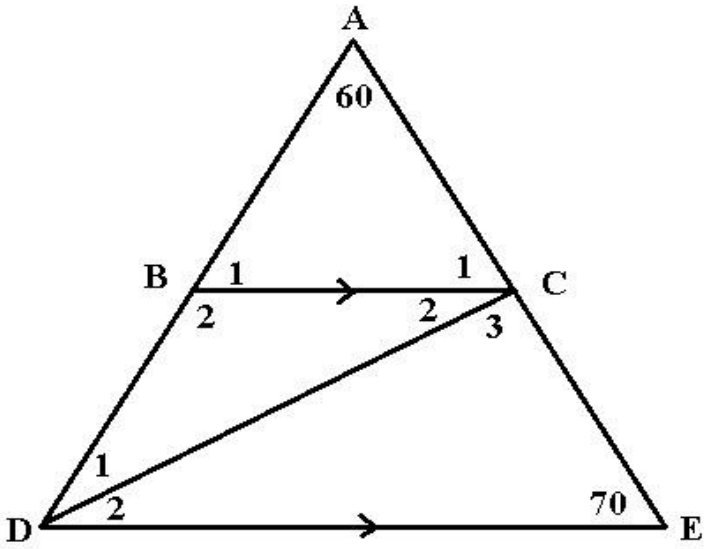
(5)

7.2 Using a pencil, ruler and a pair of compasses construct ΔEFG with FG = 6,5 cm, EG = 6 cm and EF = 3 cm.

(4)

7.3 Study the following diagram and then answer the questions that follow.

BC//DE and $\widehat{D}_1 = \widehat{D}_2$. Determine the size of the following angles with reasons.



1

7.3.

Statement	Reason

(2)

7.3.2 $\hat{C}_1$, $\hat{C}_2$ and $\hat{C}_3$.

Statement	Reason

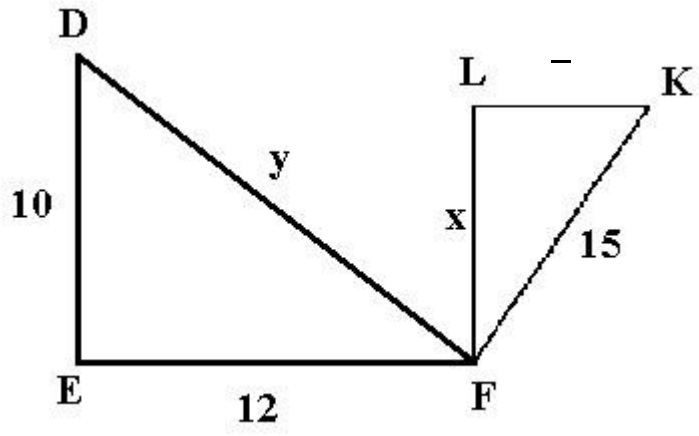
(6)

7.3.3 $\hat{B}_1$ and $\hat{B}_2$.

Statement	Reason

(4)

7.4 In the diagram below ΔDEF /// ΔKLF. Determine the values of x and y. Round off your answer to the nearest whole numbers.



Statement	Reason

(3)

QUESTION 8 [11]

Given below are the heights in cm of 12 learners at a school.

142	163	169	132
161	132	162	172
141	170	156	155

8.1 Arrange the heights in ascending order.

_____

_____ (1)

8.2 Determine the following:

8.2.1 The average height of the 12 learners

_____

_____ (2)

8.2.2 The median

_____

_____ (2)

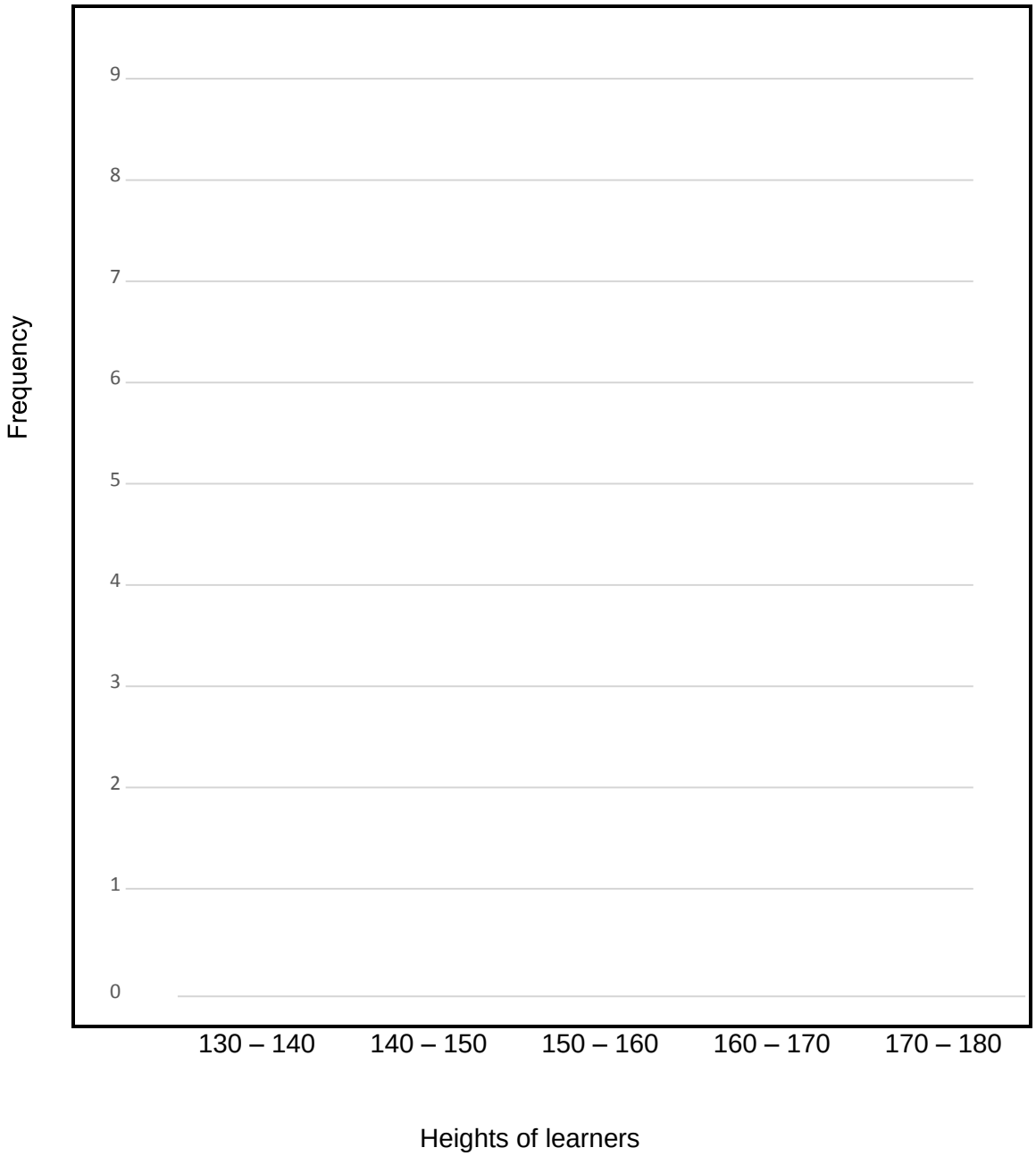
8.2.3 The mode

_____

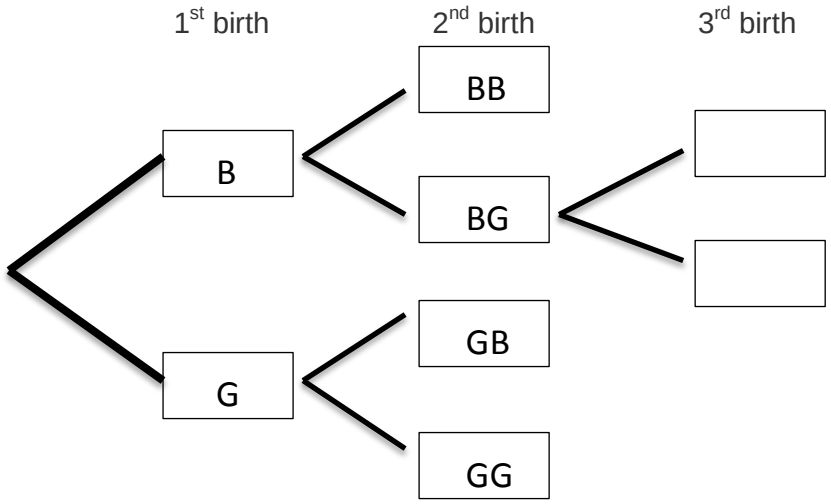
_____ (1)

8.3 Use the following table to draw a bar graph. (3)

Height in cm	Frequency
130 ≤ h < 140	7
140 ≤ h < 150	5
150 ≤ h < 160	7
160 ≤ h < 170	9
170 ≤ h < 180	2



8.4 The tree diagram below shows the possible outcome of a child's birth up to the third birth.
B represents a boy child and G represents a girl child. Complete the missing outcome in the third birth. (2)



TOTAL: 100

END

FORMULA SHEET

Simple Interest:	Compound Interest:
$I = \frac{}{100}Prn$ $A = P(1 + in)$ $A = P(1 + \frac{rn}{100})$	$A = P(1 + i)^n$ $A = P(1 + \frac{r}{100})^n$

	Perimeter	**Area**
Rectangle	$2(l + b)$	$l \times b$
Circle	$2\pi r$	πr^2
Triangle	$(s1 + s2 + s3)$	$\frac{1}{2}b \times\perp h$

Grade 9 Examination Exemplar 5 Memo

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

QUESTION / *VRAAG* 1

1.1	C
1.2	D
1.3	B
1.4	A
1.5	C
1.6	C
1.7	B
1.8	B
1.9	C
1.10	C

QUESTION / *VRAAG* 2

2.1.1	$\frac{1}{2}(a+b)-4a\left(\frac{1}{4}\right)-b$ $=\frac{a-2a+b-2b}{2}$ $=\frac{-a-b}{2}$	1 for / *vir* a-2a 1 for / *vir* b-2b 1 for answer / *vir antwoord*
2.1.2	$\frac{4}{x-5}+\frac{3}{x-2}$ $=\frac{4(x-2)+3(x-5)}{(x-2)(x-5)}$ $=\frac{7x-23}{(x-2)(x-5)}$	1 for / *vir* $4(x-2)$ 1 for/ *vir* $3(x-5)$ 1 for LCD /*vir* KGV 1 for answer / *vir antwoord*
2.1.3	$\frac{x^2+x-2}{x-1}\div\frac{x^2+2x}{4}$ $=\frac{(x+2)(x-1)}{x-1}\times\frac{4}{x(x+2)}$ $=\frac{4}{x}$	1 for / vir $(x+2)(x-1)$ 1 for multiply / *vir maal* 1 for / *vir* $x(x+2)$ 1 for answer / *vir antwoord*

2.2.1	$24xy - 16x^2y + 8xy^2$ $= 8xy(3 - 2x + y)$	1 for / *vir* $8xy$ 1 for / *vir* $(3 - 2x + y)$
2.2.2	$x^2(x - 3) - 4(x - 3)$ $= (x - 3)(x^2 - 4)$ $= (x - 3)(x - 2)(x + 2)$	1 for / *vir* $x - 3$ 1 for / *vir* $(x^2 - 4)$ 1 for / *vir* $= (3 - x)(x - 2)(x + 2)$
2.3.1	$4(x + 2) = 16 + 2(x - 1)$ $4x + 8 = 16 + 2x - 2$ $2x = 6$ $x = 3$	1 for / *vir* $4x + 8$ 1 for / *vir* $2x - 2$ 1 for / *vir* $x = 3$
2.3.2	$3^x = \frac{1}{27}$ $3^x = 3^{-3}$ $x = -3$	1 for / *vir* 3^{-3} 1 for / *vir* $x = -3$

QUESTION / *VRAAG 3*

3.1.1	$R799 - R79{,}90$ $= R719{,}10$	1 for / *vir* $R719{,}10$
3.1.2	$R719{,}10 \times 0{,}2 = R143{,}82$ $R143{,}82 \times 3 = R431{,}46$ OR $SI = Pni$ $= 719{,}10 \times 3 \times 20\%$ $= R431{,}46$	1 for / *vir* $\times 0{,}2$ 1 for / *vir* $\times 3$ 1 for / *vir* $R431{,}46$
3.1.3	$R719{,}10 + R431{,}46$ $= R1150{,}56$	1 for adding / *vir optel* 1 for / *vir* $R1150{,}56$
3.1.4	$\frac{R1150{,}56}{36}$ $= R31{,}96$	1 for / *vir* 36 1 for / *vir* $R31{,}96$
3.1.5	$R1150{,}56 + R79{,}90$ $= R1230{,}46$	1 for adding / *vir optel* 1 for / *vir* $R1230{,}46$
3.2	A: R40 – R18,50 = R21,50 .... 1kg B: (0,5 x R21,50)+R4,25 = R15,00 C: 3,5 x R21,50 = R75,25 R200 – R75,25 = R124,75	1 for / *vir* 1 kg 1 for / *vir* R15,00 1 for / vir R124,75

QUESTION / *VRAAG* 4

4.1.1	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{5-1}{1-0}$ $= 4$	1 for substitution / *vir substitusie* 1 for / *vir* 4
4.1.2	y = mx+c y = 4x+1	1 for / *vir* m=4 1 for / *vir* 1

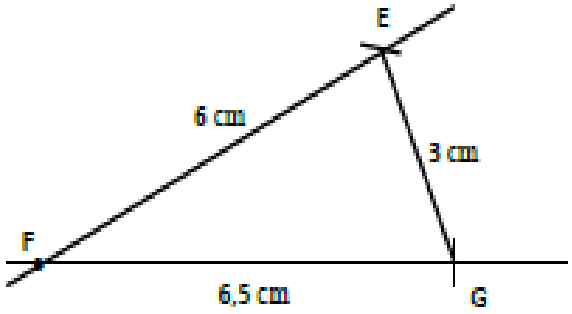
QUESTION / *VRAAG* 5

5.1	22; 28	1 for / *vir* 22 and 1 for / *vir* 28
5.2	Add 6 to the previous term to get the next term. / *Die verskil van 6 is by die vorige termyn bygevoeg om die volgende termyn te verkry.*	1 for answer / *vir antwoord*
5.3	$T_n = 6n - 2$	1 for substitution and 1 for the answer / *1 vir substitusie en 1 vir die antwoord*
5.4	$T_{10} = 6(10) - 2$ $= 58$	1 for substitution and 1 for the answer / *1 vir substitusie en 1 vir die antwoord*
5.5	$T = 6n - 2$ $76 = 6n - 2$ $\frac{78}{6} = \frac{6n}{6}$ $13 = n$	1 for substitution / *vir substitusie* 1 for / *vir* 78 1 for the answer / *vir die antwoord.*

QUESTION / *VRAAG 6*

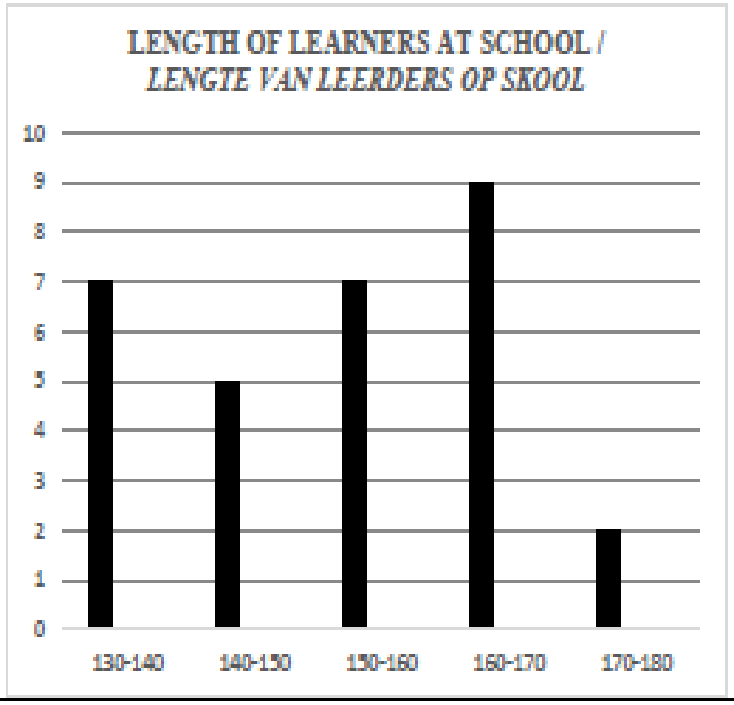
6.1	$V = \frac{1}{2} b \times h \times H$ $= \frac{1}{2} \times 48\text{ cm} \times 20\text{ cm} \times 72\text{ cm}$ $= 34\,560\text{ cm}^3$	1 for substitution / *vir substitusie* 1 for answer / *vir antwoord*
6.2	$SA = 2(\frac{1}{2} b \times h) + (b + s + s) \times H$ $= 2(\frac{1}{2} \times 48\text{ cm} \times 20\text{ cm}) + (48\text{ cm} + 25\text{ cm} + 25\text{ cm}) \times 72\text{ cm}$ $= 960 + 7\,056$ $= 8\,016\text{ cm}^2$	1 for substitution / *vir substitusie* (48 cm x 20 cm) 1 for substitution / *vir substitusie* (48 cm + 50 cm) x 72 cm 1 for answer / *vir antwoord*
6.3	In Δ ABD $(AD)^2 = (AB)^2 - (BD)^2$ Pythagoras theorem / *teorie* $= (25\text{ cm})^2 - (24\text{ cm})^2$ $= 625\text{ cm}^2 - 576\text{ cm}^2$ $= 49\text{ cm}^2$ $\therefore$ AD = 7 cm OR / *OF* $(AC)^2 = (AD)^2 + (DC)^2$ (Pythagoras) $(AD)^2 = (AC) - (DC)^2$ $= (25\text{ cm})^2 - (24\text{ cm})^2$ $= 625\text{ cm}^2 - 576\text{ cm}^2$ $= 49\text{ cm}^2$ $\therefore$ AD = 7 cm	1 for Pythagoras theorem / *vir Pythagoras teorie* 1 for substitution / *vir substitusie* 1 for / *vir* 49 cm^2 1 for answer / *vir antwoord* 1 for Pythagoros theorem / *vir Pythagoras teorie* 1 for substitution / *vir substitusie* 1 for / *vir* 49 cm^2 1 for answer / *vir antwoord*

QUESTION / *VRAAG 7*

7.1.1	Vertically Opposite angles / *Vertikale teenoorgestelde hoeke*	1 for reason / *rede*
7.1.2	$B_1 = F_4$	1 for answer / *antwoord*
7.1.3	180°	1 for answer / *antwoord*
7.1.4	CF or FC ; $\sphericalangle$ s opposite the equal sides / *teenoorgestelde van die ewewydige sy*	1 for CF / *vir CF* 1 for reason / *vir rede*
7.2		2 Construct / *konstrueer* Δ correctly / *korrek* 1 Correct length, sizes / *korrekte lengte, groottes* 1 Labelling / *etikettering* FG, EF & EG.
7.3.1	$D_1 + D_2 = 50°$ $D_2 = 25°$ $\sphericalangle$ s *of* Δ= 180° / *Binnehoeke van* Δ= 180°	1 for answer / *antwoord* 1 for reason / *rede*
7.3.2	$C_1 = 70°$ (E) Corr. angles / *Ooreenk hoeke* $C_2 = D_2$ Alt. angles / *Verwiss hoeke* $C_2 = 25°$ $C_1 + C_2 + C_3 = 180°$ Angles on straight line / *Hoeke op reguit lyn* $C_3 = 85°$	1 for answer / *antwoord* 1 for reason / *rede* 1 for answer / *antwoord* 1 for reason / *rede* 1 for answer / *antwoord* 1 for reason / *rede*
7.3.3	$B_1 = D$ (50°) Corr. angles / *Ooreenkomstige hoeke* $B_1 = 50°$ $B_2 = 180° - 50° = 130°$ Angles on straight lines / *Hoeke op reguit lyne* Or / of $B_2 = 180° - D_1 - C_2$ $= 180° - 25° - 25°$ $= 130°$ Sum of angles of triangle. / *Som van hoeke op driehoek.*	1 for answer / *antwoord* 1 for reason / *rede* 1 for answer / *antwoord* 1 for reason / *rede*

7.4	$\frac{DF}{KF}=\frac{DE}{KL}=\frac{EF}{LF}$ $\frac{y}{15}=\frac{10}{3\frac{1}{3}}=\frac{12}{x}$ $y=45 \quad x=4$	1 for substitution / *substitusie* 1 for / *vir* 45 1 for / *vir* 4

QUESTION / *VRAAG* 8

8.1	132 132 141 142 155 156 161 162 163 169 170 172	1 all correct / *almal reg*
8.2.1	$\frac{1855}{12}=154{,}58$	1 for / *vir* 1855 1 for answer / *vir antwoord*
8.2.2	$\frac{156+161}{2}=158{,}5$	1 for / *vir* 156 + 161 1 for answer / *vir antwoord*
8.2.3	132	1 for answer / *vir antwoord*
8.3		1 for / *vir* 2 1 for / *vir* 4 1 for / *vir* 1
8.4	BGB BGG	1 for / *vir* BGB 1 for / *vir* BGG