



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

**GAUTENG DEPARTMENT OF EDUCATION
PROVINCIAL EXAMINATION
NOVEMBER 2016
GRADE 9**

MATHEMATICS

MEMORANDUM

9 pages

**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

$$2.1 \quad 2.1.1 \quad P = A(1+i)^n \quad \checkmark \quad (3)$$

$$= 15000(1+0,08)^1 \quad \checkmark$$

$$= R16200 \quad \checkmark$$

$$2.1.2 \quad P = A(1+i)^n \quad \checkmark$$

$$= 15000(1+0,08)^5 \quad \checkmark$$

$$= R22039,92115 \approx R22039,92 \quad \checkmark \quad (3)$$

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

$$= -4 + 9 \checkmark$$

$$= 5 \checkmark$$

(2)

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

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

$$9 : 18 : 4 \checkmark$$

(2)

$$2.4 \quad \frac{16,5l}{100km} = \frac{x l}{1284km} \checkmark$$

$$100x = 21186 \checkmark$$

$$x = 211,86 \checkmark$$

(2)

[12]**QUESTION 3**3.1 3.1.1 3 Balls $\checkmark$

(1)

3.1.2

Figure	1	4	5
Number of balls	5	14 $\checkmark$	17 $\checkmark$

(2)

3.1.3 Yes. $\checkmark$

Difference is 3

$$T_n = 3n + 2 \checkmark$$

$$3(n-1) + 5 = 3n - 3 + 5 = 3n + 2 \checkmark$$

(3)

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

$$\text{LHS} = (2x-1)(2x-1)$$

$$= 4x^2 - 4x + 1 \checkmark$$

$$\text{Not correct} / 4x^2 + 1 \neq 4x^2 - 4x + 1 \checkmark$$

(2)

[8]

QUESTION 4

$$\begin{aligned}
 4.1 \quad & -2(2x^2 - 3x + 5) - (4x^2 - 3) \\
 & = -4x^2 + 6x - 10 - 4x^2 + 3 \checkmark \checkmark \\
 & = -8x^2 + 6x - 7 \checkmark
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 4.2 \quad 4.2.1 \quad & -\frac{b^3}{12}\left(4b - \frac{2ab}{6} + 12\right) \\
 & = -\frac{b^4}{3} \checkmark + \frac{ab^4}{36} \checkmark - b^3 \checkmark
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 4.2.2 \quad & \frac{4x^3 - 2x(3x^2)}{2x^3} \\
 & = \frac{4x^3 - 6x^3}{2x^3} \checkmark \\
 & = \frac{-2x^3}{2x^3} \checkmark \\
 & = -1 \checkmark
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 4.3 \quad & x(a + y) - (y + a) \\
 & = x(a + y) - (a + y) \checkmark \\
 & = (a + y)(x - 1) \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 4.4 \quad 4.4.1 \quad & 2(x + 2) - (x - 3) = 5 \\
 & 2x + 4 - x + 3 = 5 \checkmark \checkmark \\
 & x + 7 = 5 \checkmark \\
 & x = -2 \checkmark
 \end{aligned}
 \tag{4}$$

$$\begin{aligned}
 4.4.2 \quad & \frac{2x}{x+1} + \frac{2x}{1-x} = \frac{1}{x^2-1} \\
 & \frac{2x}{x+1} - \frac{2x}{x-1} \checkmark = \frac{1}{(x-1)(x+1)} \checkmark \\
 & 2x(x-1) - 2x(x+1) = 1 \\
 & 2x^2 - 2x \checkmark - 2x^2 - 2x \checkmark = 1 \\
 & -4x = 1 \\
 & x = -\frac{1}{4} \checkmark
 \end{aligned}
 \tag{5}$$

$$4.4.3 \quad 10^x = 0,0001$$

$$10^x = 10^{-4} \checkmark$$

$$x = -4 \checkmark$$

(2)

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

$$\therefore 2x + 2x + 2 + 2x + 4 = 78 \checkmark$$

$$6x + 6 = 78$$

$$6x = 78 - 6$$

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

$$x = 12 \checkmark$$

$\therefore$ the numbers are $24 \checkmark$, $26 \checkmark$ and $28 \checkmark$

(5)

[27]

QUESTION 5

$$5.1 \quad y = 2x - 1 \checkmark \checkmark$$

(2)

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

$$m = \frac{-3 - 0}{-2 - 0} \checkmark$$

$$= \frac{3}{2} \checkmark$$

(2)

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

$$5.3.1 \quad y\text{-intercept} = -3$$

(1)

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

$$0 - 1 = 2(x - 2) \checkmark$$

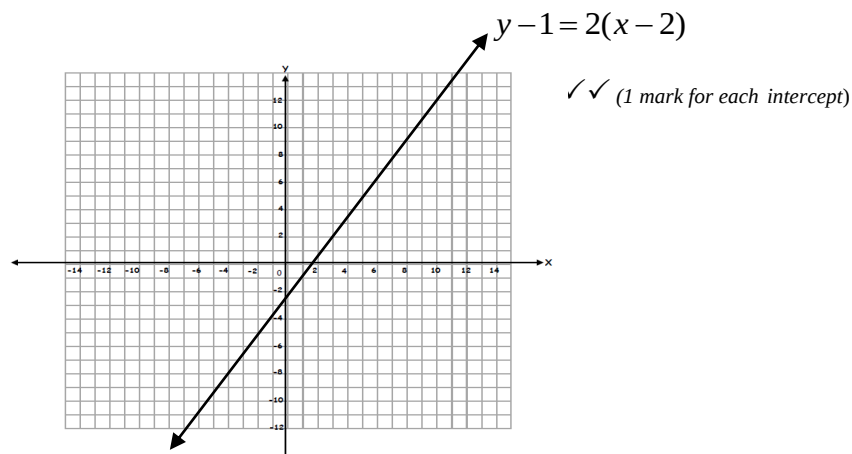
$$0 - 1 = 2x - 4$$

$$3 = 2x \checkmark$$

$$x = \frac{3}{2} \checkmark$$

(3)

5.3.3



(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 $a = 55^\circ$ ✓ [corresponding angles of parallel lines] ✓

$b = 55^\circ$ ✓ [opposite angles of a parallelogram] ✓

(4)

6.2 $AB = BE$ [given] ✓

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

$\therefore DC = BE$ ✓ [both = AB] ✓

(4)

6.3 6.3.1 In $\triangle DCB$ and $\triangle AED$

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

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

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

$\therefore \triangle DCB \parallel \triangle AED$ [AAA]

(6)

$$6.3.2 \quad \frac{AD}{DB} = \frac{ED}{CB} \checkmark$$

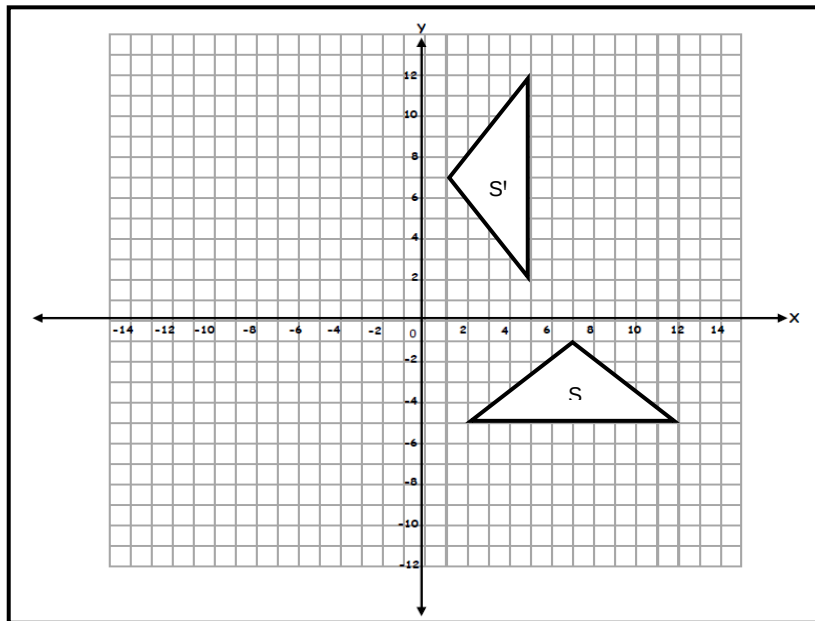
$$\frac{AD}{5,2 \text{ cm}} = \frac{7,5 \text{ cm}}{3 \text{ cm}} \checkmark$$

$$AD = 13 \text{ cm} \checkmark$$

$$\begin{aligned} \therefore AB &= 13 \text{ cm} - 5,2 \text{ cm} \\ &= 7,8 \text{ cm} \checkmark \end{aligned}$$

(4)

6.4



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

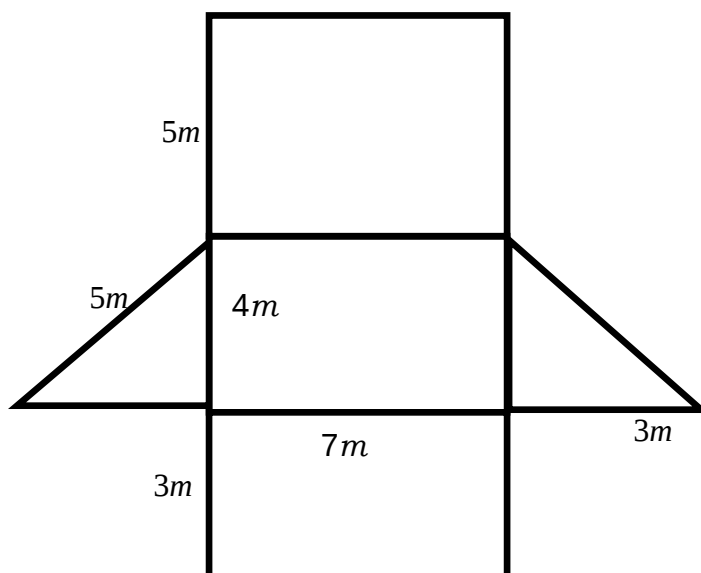
(3)
[21]**QUESTION 7**

7.1 7.1.1 Find the length of BC.

$$\begin{aligned} BC^2 &= AB^2 + AC^2 \\ &= (3 \text{ m})^2 + (4 \text{ m})^2 \checkmark \\ &= 9 \text{ m}^2 + 16 \text{ m}^2 \checkmark \\ &= 25 \text{ m}^2 \checkmark \\ BC &= 5 \text{ m} \checkmark \end{aligned}$$

(4)

7.1.2



(1)

$$\begin{aligned}
 7.1.3 \quad \text{Surface Area} &= (5 \text{ m} \times 7 \text{ m}) + (4 \text{ m} \times 7 \text{ m}) + 2\left(\frac{1}{2} \times 4 \times 3\right) + (3 \text{ m} \times 7 \text{ m}) \checkmark \\
 &= 35 \text{ m}^2 + 28 \text{ m}^2 + 12 \text{ m}^2 + 21 \text{ m}^2 \checkmark \\
 &= 96 \text{ m}^2 \checkmark
 \end{aligned}$$

(3)

7.2

$$160m \times x = 480\,000 \text{ m}^2 \checkmark$$

$$160xm = 48\,0000 \text{ m}^2$$

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

$$x = 3\,000 \text{ m} \checkmark$$

$$\text{Length needed} = 2(160 \text{ m} + 3\,000 \text{ m}) \checkmark$$

$$= 6\,320 \text{ m} \checkmark$$

(4)

$$7.3 \quad 7.3.1 \quad V = 300 \text{ cm} \times 500 \text{ cm} \times 700 \text{ cm} \checkmark$$

$$= 105\,000\,000 \text{ cm}^3 \checkmark$$

(2)

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

$$= 105\,000 \text{ l} \checkmark$$

(2)

[16]

QUESTION 8

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

$$\text{Median} = \frac{16 + 24}{2} \checkmark$$

$$= 20 \checkmark$$

(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 $P(B) = \frac{3}{6} \checkmark = \frac{1}{2} \checkmark$

(2)

8.3.2 $P(\text{Not } W) = \frac{5}{6} \checkmark$

(1)

[12]**TOTAL: 120**