Exam exemplar (November) Memorandum

Learner's Book page 532

Paper 1: Algebra (Marks: 100)

Question 1

No.	N	Z	Q	Q'
$\sqrt{11}$	✗	✗	✗	✓
$\frac{3}{4}$	✗	✗	✓	✓
0	✗	✓	✓	✓
$3{,}\dot{2}\dot{5}$	✗	✗	✓	✓
$\sqrt{-6}$	✗	✗	✗	✗

[8]

Question 2

2.1.1 2,136

2.1.2 $\frac{49}{4}$

2.1.3 –3,875

2.1.4 2,6

2.2.1 $\frac{322}{25}$

2.2.2 $\frac{212}{99}$ **[6]**

Question 3

3.1.1 12 (2)

3.1.2 $3(2a)^2 - 2(2a) + 7$ (2)

$= 12a^2 - 4a + 7$

3.2 $3a + 2b - 3c$

$= 3b + 3a - 3c - (2a + 3b - 4c) = a + c$ *(4)*

3.3 5 : 9 = 1 218 learners

14 units = 1 218

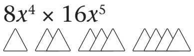
∴ 1 unit = 87 (2)

Boys = 9 × 87 = 783 **[10]**

Question 4

4.1.1 –10; –14 (2)

4.1.2 $8x^4 \times 16x^5$ (2)

4.2.1  **(2)**

4.2.2

Term number	1	2	3	4	5	25
Matches	6	10	14	18	22	102

(4)

4.2.3 $T_n = 4n + 2$ (2)

4.2.4 $4n + 2 = 402$ (2)

- $(4n = 400; n = 100)$ **[14]**

Question 5

5.1.1 $2x^2 + 6x + x + 3$ (2)

$= 2x^2 + 7x + 3$

5.1.2 $(2x - 3y)(2x - 3y)$ (3)

- $4x^2 - 6xy - 6xy + 9y^2 = 4x^2 - 12xy + 9y^2)$

5.2 $(2x + 3)^2 - (x - 1)^2$

- $(2x + 3)(2x + 3) - (x - 1)(x - 1) = 4x^2 + 6x + 6x + 9 - (x^2 - x - x + 1)$ (8)

$= 4x^2 + 12x + 9 - x^2 + 2x - 1 = 3x^2 + 14x = 8$

[13]

Question 6

6.1 $3xy(x - 2y^3)$ (2)

6.2 $2(x^4 - 16)$ (3)

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

6.3 $(x + 9)\ (x - 2)$ (3)

6.4 $2x\ (x^2 + 3x - 10)$

$2x(x + 5)(x - 2)$

[10]

Question 7

7.1 $\frac{2x(x-5)}{2(x^2-25)} = \frac{2x(x-5)}{2(x-5)(x+5)}$ (4)

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

7.2 $\frac{4(4p+1)-5(3p-2)}{20}$ (4)

$\frac{416p + 4 - 15p + 10}{20} = \frac{p+14}{20}$ **[8]**

Question 8

8.1.1 y^{10} (1)

8.1.2 $\frac{2n^2}{4n} = \frac{n}{2}$ (2)

8.1.3 $8x^{32}$ (2)

8.2.1 $\frac{9x^2y^6}{18x^2y^4} = \frac{y^2}{2}$ (3)

8.2.2 $\frac{4}{wv^2} \times \frac{y^2}{6wv^3} = \frac{4}{3v^4w^3}$ (3)

8.3 $b = 15$ (1)

8.4 $\sqrt{(-1)^2 - (-2)^3}$ (3)

$= \sqrt{1+8} = \sqrt{9} = 3$

8.5 $4{,}6 \times 10^{-6}$ (1)

8.6 $\frac{3 \times 10^8}{1000} = 3 \times 10^5$ km/second (2)

$3 \times 10^5 \times 60 \times 60 \times 24 \times 365$

$= 9{,}4608 \times 10^{12}$

[18]

Question 9

9.1.1 $-6x = -30$ (2)

$x = 5$

9.1.2 $2^x = 2^6$ (1)

$x = 6$

9.1.3 $3(x + 3) - 2(x - 6) = 6(x - 4)$

$3x + 9 - 2x + 12 = 6x - 24$

$-5x + 21 = -24$

$-5x = -45$

$x = 9$ (4)

9.1.4 $x = a$ *or* $x = b$ *(3)*

9.2

	Now	Future
John	$x + 5$	$x + 12$
Mary	$= \frac{3}{4}$	John
$x + 7$	$= \frac{3}{4}(x + 12)$	
$4x + 28$	$= 3x + 36$	
x	$= 8$	

(3)

[13]

Paper 2: Geometry and data handling [Marks: 135]

Question 1

1.1.1 $\angle A = 60°$ ($\triangle ABC$ is equilateral) (2)

1.1.2 $GC^2 = EC^2 + GE^2$

$= (4\text{ cm})^2 + (3\text{ cm})^2$

$= 16\text{ cm}^2 + 9\text{ cm}^2$

$\therefore GC = 5\text{ cm}$ (4)

1.1.3 DB = 4 cm (opposite sides of a rectangle) (2)

1.1.4 In $\triangle ABC$ and $\triangle AFG$

$\angle A$ = common

$\angle ABC = \angle AFG$ (corresponding angles, DC||BC)

$\therefore \triangle ABC \,|||\, \triangle AFG$ (equiangular triangles) (5)

1.1.5 $\frac{FG}{BC} = \frac{AG}{AC}$

$FG = BC \times \frac{AG}{AC}$

But BC = AC = 4 cm + 5 cm = 9 cm

$\therefore FG = 9\text{ cm} \times \frac{4\text{ cm}}{9\text{ cm}}$

$= 4$ cm

or

Since $\triangle ABC|||\triangle AFG$ (from 1.1.4 above)

$\triangle AFG$ is an equilateral triangle

$\therefore$ FG = 4 cm (4)

1.1.6 $\angle GXE = 180° - (\angle E = \angle EC)$ (sum of interior angles of a $\triangle$)

But $\angle EGC = \angle AGF$ (vertically opposite angles)

$\angle AGF = 60°$ ($\triangle AFG$ is equilateral)

$\therefore \angle EGC = 60°$

$\therefore \angle GCE = 180° - 90° - 60°$

$= 30°$ (5)

1.1.7 In $\triangle EGC$ and $\triangle DFB$
$\angle E = 90° = \angle D$ (DECB is a rectangle)
GC = BF = 5 cm
DB = EC (opposite sides of a rectangle)
$\therefore \triangle EGC \equiv \triangle DFB$ (RHS) (5)
1.2.1 $180°(n - 2)$ (2)
1.2.2 $180°(10 - 2)$
$= 180° \times 8$
$= 1\ 440°$ (3)
[32]

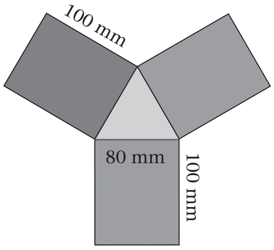
Question 2

2.1.1 $\angle KRS = \angle K + \angle KQR$ (external angle of a triangle theorem)
$\therefore \angle KRS = 50° + 40° = 90°$ (3)
2.1.2 In $\triangle KLM$ and $\triangle KQR$,
$\angle K$ is common
$\angle KLM = \angle KQR$ (corresponding angles, PS||LN)
$\therefore \triangle KLM\ |||\ \triangle KQR$ (equiangular triangles) (5)
2.1.3 KM = KR + RM
= 20 mm + 40 mm
= 60 mm (2)
2.1.4 $\frac{KQ}{KL} = \frac{KR}{KM}$
$KQ = 100 \text{ mm} \times \frac{2\cancel{0} \text{ mm}}{6\cancel{0} \text{ mm}}$
= 33,3 mm (4)
2.1.5 $\angle KRS = 90°$ (from **2.1.1** above)
$\angle KRS = \angle KMN$ (corresponding angles, PS||LN)
$\therefore \angle KMN = 90°$
$\angle KML = 180° - 90° = 90°$
$\therefore \triangle KML$ is a right-angled triangle (4)
2.1.6 $LM^2 = KL^2 - KM^2$ (Pythagoras theorem)
$= (100 \text{ mm})^2 - (60 \text{ mm})^2$
$= 10\ 000 \text{ mm}^2 - 3\ 600 \text{ mm}^2$
$= 6\ 400$ (4)
$\therefore LM = \sqrt{6\ 400} = 80$ mm
2.1.7 Area $\triangle$ KLM $= \frac{1}{2}$base $\times$ height
$= \frac{1}{2} \times 80 \text{ mm} \times 60 \text{ mm}$
$= 2\ 400 \text{ mm}^2$
$= 24 \text{ cm}^2$ (4)
2.1.8 Area of trapezium QRML $= \frac{1}{2}(QR + LM) \times RM$
$= \frac{1}{2}(26{,}66 + 80 \text{ mm}) \times 40$ mm
$= 2\ 133{,}33$
Area of $\triangle KLM = 2\ 400$ mm (from **2.1.7** above)
Area of $\triangle KQR = \frac{1}{2} QR \times KR$
$= \frac{1}{2} \times 26{,}66 \text{ mm} \times 20 \text{ mm}$
$= 266{,}6 \text{ mm}^2$
$\therefore$ area $\triangle KLM$ – area $\triangle KQR$
$= 2\ 400 \text{ mm}^2 - 266{,}6 \text{ mm}^2$
$= 2\ 133{,}3$ = area of trapezium QRML as required (6)
2.2.1 F(2; –1); E(1; –3); G(4; –3); H(3; –4); I(2; –3) (5)
2.2.2 translation by 3 units up (2)
2.2.3 $F_1(-1; 2)$; $E_1(-3; 1)$; G(–3; 4); H(–4; 3) and I(–3; 2) (5)
[44]

Question 3

3.1.1 100 mm (1)

3.1.2 (3)



3.1.3 Surface area = $3 \times (100 \text{ mm})^2 + 2(\frac{1}{2} \times 100 \text{ mm} \times 80 \text{ mm})$
$= 30\,000 \text{ mm} + 2\,000 \text{ mm}$
$= 32\,000 \text{ mm}^2$ (4)

3.1.4 Volume(prism) = $\frac{1}{2}$base × height × height
$= \frac{1}{2}(100 \text{ mm} \times 80 \text{ mm}) \times 100 \text{ mm}$
$= 400\,000 \text{ mm}^3$ (4)

3.2.1 hexahedron or cube (2)

3.2.2 6 faces (1)

3.2.3 V – E + F = 2 (Euler's Theorem)
V = 2 + E – F
= 2 + 12 – 6
= 8 (3)

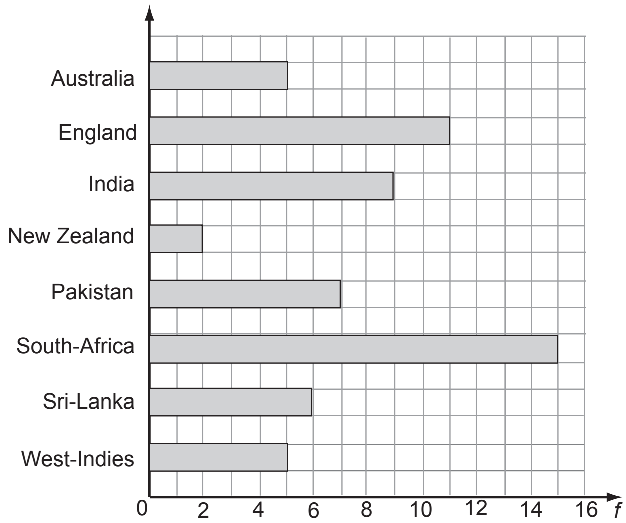
[18]

Question 4

4.1.1 60 people (2)

4.1.2 bar graph or pie chart or frequency table (2)

4.1.3 (5)

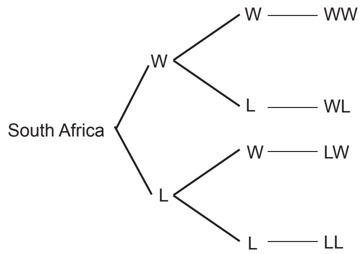


Result of survey to determine the favourite to win the T20-cricket tournament in 2012.

4.1.4.1 SA (1)

4.1.4.2 Kiwis (New Zealand) (1)

4.2.1 (6)



4.2.2 P(at least W) = $\frac{3}{4}$ (4)

4.2.3 P(WW) = $\frac{1}{4}$ (3)

4.3.1 Range = 98 – 61 = 37 (3)

4.3.2 61........65........67........72........75........80........86........90........98........98

Median = $[75 + \frac{80}{2}]$

= 77,5 (3)

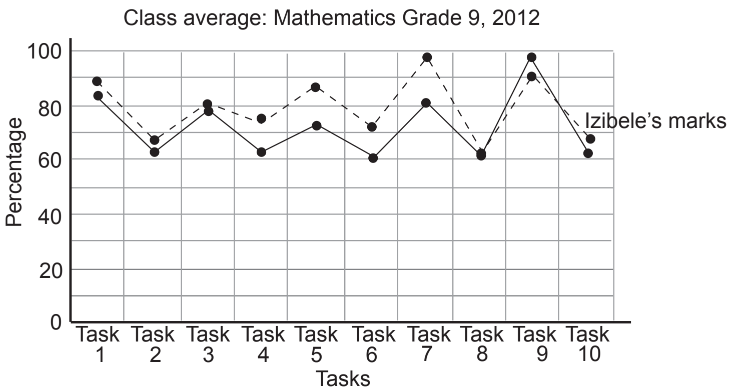
4.3.3 Mean = $\frac{\text{sum}}{\text{number of marks}}$

= $\frac{792}{10}$

= 79,2 (3)

4.4

4.4.1 (6)



4.4.2 Izibele's performance is above the class average except for test 9.
Izibele will pass Maths with a good score. (2)

[41]