Exam exemplar (November) Additional Memorandum

Paper I: Algebra [Marks: 120]

Question 1

1.1.1 $n = \frac{a}{b}$ or $n = \frac{b}{a}$ (4)

1.1.2 $a = \frac{a}{1}$ which is rational (2)

1.1.3 $0{,}45 = \frac{45}{100}$

$= \frac{9}{20}$ (3)

1.1.4 Let $r = 0{,}12121212\ldots$

Then $100r = 12{,}121212\ldots$

So $100r - r = 12{,}121212\ldots - 0{,}121212$

$99r = 12$

$r = \frac{12}{99} = \frac{4}{33}$ (4)

1.2.1 $(1\frac{3}{7} + 2) \div \frac{8}{3}$

$= (\frac{10}{7} + 2) \div \frac{8}{3}$

$= \frac{24}{7} \times \frac{3}{8}$

$= \frac{9}{7}$ (3)

1.2.2 $(1{,}82 \times 10^{-3}) \times (1{,}15 \times 10^{3})$

$= 1{,}82 \times 1{,}15$

$= 2{,}093$ (2)

1.3 $T_n = \frac{1}{n^2} + 2$

1.3.1 $T_1 = \frac{1}{1^2} + 2 = 1 + 2 = 3$ (2)

1.3.2 $3; \frac{1}{2^2} + 2; \frac{1}{3^2} + 2; \frac{1}{4^2} + 2; 3; \frac{9}{4}; \frac{19}{9}; \frac{33}{16}$ (3)

1.3.3 $\frac{201}{100} = \frac{1}{n^2} + 2$

$\frac{1}{n^2} = \frac{201}{100} - 2$

$\frac{1}{n^2} = \frac{1}{100}$

$n^2 = 100$

$\therefore n = +10$

10th term, or by inspection. (2)

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Question 2

2.1.1 60 metres (2)

2.1.2 Average speed = $\frac{60\text{ m}}{15\text{ m}}$
= 4 m/min (4)

2.1.3 She is at the shop buying milk and bread. (2)

2.1.4 Bella took 35 min
= 35 min × $\frac{1\text{ h}}{60\text{ min}}$
= 0,58 h (3)

2.1.5 Between D and E (2)

2.2.1 Amount $P(1 + 8)n$
= R2 000$(1 + \frac{8}{10})^2$
= R2 332,80 (4)

2.2.2 For Vuyo, P = R2 000; A = R2 332,80; $n = 2$
Using simple interest formula
$1 + nr = \frac{A}{P}$
$nr = \frac{A}{P} - 1$
$= \frac{\text{R2 332,80}}{\text{R2 000}} - 1$
$= \text{R2 332,80} - \frac{\text{R2 000}}{\text{R2 000}}$
$r = 0{,}0832$
= 8,32% (4)

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Question 3

3.1.1 6 terms (2)

3.1.2 6 (2)

3.1.3 $(r - s)$ (2)

3.2.1 $\frac{-4p^4q^3r^2}{4p^2q^{-2}r^3}$
$= \frac{-p^2q^5}{r}$ (3)

3.2.2 $4x(x - y) - 5x(2x - y)$
$= 4x^2 - 4xy - 10x^2 + 5xy$
$= -6x^2 + xy$ (3)

3.2.3 $2x^2(xy - 3y + 4x) - (x^2y + 2x^3 - x^3y) + 4x^2y$
$= 2x^3y - 6x^2y + 8x^3 - x^2y - 2x^3 + x^3y + 4x^2y$
$= 3x^3y - 3x^2y + 6x^3$ (4)

3.2.4 $(5p + 2q)(-2q + 5p)$
$= -10pq + 25p^2 - 4q^2 + 10pq$
$= 25p^2 - 4q^2$ (3)

3.2.5 $(4x - 3y)^2 = (4x - 3y)(4x - 3y)$
$= 16x^2 - 12xy - 12xy + 9y^2$
$= 16x^2 - 24xy + 9y^2$ (4)

3.2.6 $\frac{2b + c}{3} + \frac{5b - c}{4}$
$= \frac{4(2b + c) + 3(5b - c)}{12}$
$= \frac{8b + 4c + 15b - 3c}{12}$
$= \frac{23b + 7c}{12}$ (4)

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Question 4

4.1.1 $(a - b) + 3(b - a)$
$= (a - b) - 3(a - b)$
$= (a - b)(1 - 3)$
$= -2(a - b)$ (2)

4.1.2 $27x^2 - 12$
$= 3(9x^2 - 4)$
$= 3[(3x)^2 - (2)^2]$
$= 3[(3x - 2)(3x + 2)]$
$= 3(3x - 2)(3x + 2)$ (4)

4.1.3 $a^2 - 5a + 6$
$= (a - 2)(a - 3)$ (3)

4.2 $\frac{x^2 - 9}{x^2 - x - 6}$
$= \frac{(x - 3)(x + 3)}{(x - 3)(x + 2)}$
$= \frac{(x + 3)}{(x + 2)}$ (4)

4.3.1 $2x + 9 = 5 - 2x$
$2x + 2x = -4$
$x = -1$ (3)

4.3.2 $4(3k - 1) + 3(k - 4) = -11k$
$12k - 4 + 3k - 12 = -11k$
$12k + 11k + 3k = 12 + 4$
$26k = 16$
$k = \frac{16}{26}$
$k = \frac{8}{13}$ (4)

4.3.3 $(2x - 3)(x - 1) = 0$
Either $(2x - 3) = 0$ or $x + 1 = 0$
$2x = 3$ or $x = -1$
$\therefore x = \frac{3}{2}$ or $x = -1$ (3)

4.3.4 $\frac{6(x + 1)}{2} = \frac{6(2x - 3)}{3}$
$3x + 3 = 4x - 6$
$3x - 4x = -6 - 3$
$-x = -9$
$\therefore x = 9$ (4)

4.3.5 $3x - \frac{1}{27} = 0$
$3x = \frac{1}{27}$
$3x = 3^{-3}$
$\therefore x = -3$ (3)

[30]

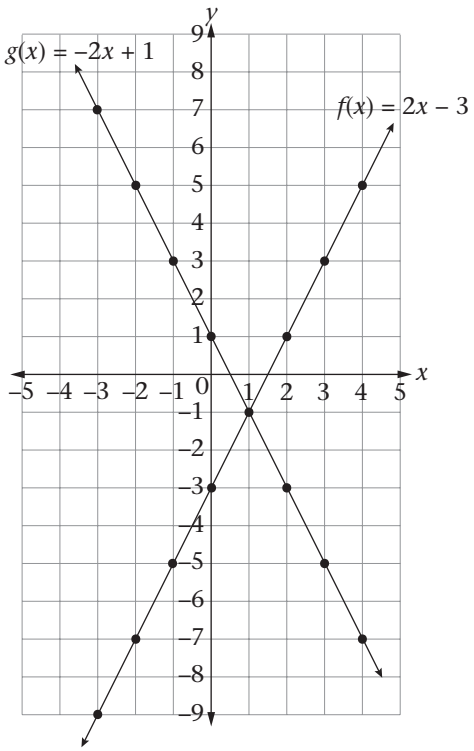
Question 5

5.1.1

x	-3	-2	-1	0	1	2	3	4
$f(x) = 2x - 3$	-9	-7	-5	-3	-1	1	3	5
$g(x) = -2x + 1$	7	5	3	1	-1	-3	-5	-7

(5)

5.1.2 (6)



5.1.3 $x = 1$ (2)

5.1.4 $2x - 3 = -2x + 1$
$4x = 1 + 3$
$4x = 4$
$x = 1$ (3)

5.1.5 The values are the answers. (1)

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[Total: 120]

Paper 2 Geometry (Marks: 100)

Question 1

1.1 True (2)

1.2 True (2)

1.3 False. Only one pair of opposite sides of a trapezium is parallel; a parallelogram has both sides parallel. (2)

1.4 False. A hexagon has six sides and so can be divided into four triangles. Its interior angles add up to 720°. (2)

1.5 False. A tetrahedron is a polyhedron but not a prism. (2)

[10]

Question 2

2.1.1 $x + A\hat{C}B = 180° - 54°$ (sum of interior angles of $\triangle ABC$)
But $x = A\hat{C}B$ (base angles of isosceles $\triangle ABC$)
$\therefore x = \frac{126°}{2}$
$x = 63°$ (5)

2.1.2 $y = \hat{A}$ (alternate angles, AB||EC)
$\therefore y = 54°$ (3)
2.1.3 $z = \hat{B} = x$ (corresponding angles, AB||EC)
$\therefore z = 63°$ (3)
2.1.4 $y + z = 54° + 63° = 117°$
$\hat{A} + x = 54° + 63° = 117°$
$\therefore y + z = \hat{A} + x$ as required (3)
2.2.1 KO = 2 cm (2)
2.2.2 $ON^2 = KN^2 - KO^2$ (Pythagoras Theorem)
$= (10\text{ cm})^2 - (2\text{ cm})^2$
$= 100\text{ cm}^2 - 4\text{ cm}^2$
$= 96\text{ cm}^2$
$\therefore$ ON = 9,78 cm (5)
2.2.3 In △LKN en △LMN
KN = MN (adjacent sides of a kite)
LK = LM (adjacent sides of a kite)
LN is common
$\therefore$ △LKN ≡ △LMN (SSS) (5)
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Question 3

3.1.1 $Q\hat{R}T = \hat{Q}$ (alternate angles, PQ||ST)
$\therefore \hat{Q} = 80°$ (3)
3.1.2 $\hat{S} = Q\hat{R}T = 80°$ (corresponding angles, PS||QR) (2)
3.1.3 $S\hat{P}Q = S\hat{R}Q$ (opposite angles of a ||rm)
Maar $S\hat{R}Q = 180° - 80° = 100°$ (angles on a straight line)
$\therefore S\hat{P}Q = 100°$ (4)
3.1.4 In △PQR and △RSP
$\hat{S} = \hat{Q}$ (opposite angles of a ||rm)
$S\hat{P}R = P\hat{R}Q$ (alternate angles, PS||QR)
$\therefore$ △PQR ≡ △RSP (4)
3.2.1 A(–5; 6); B(–5; 1); C(–1; 1) (3)
3.2.2 Translation 6 units down (2)
3.2.3 Reflection on the *y*-axis (2)
3.2.4 A(5; 6); B(5; 1); C(1; 1) (3)
[23]

Question 4

4.1.1 Circumference $= \pi d$
$= 3{,}14 \times 70$ mm
$= 219{,}8$ mm
$= 21{,}98$ cm (4)
4.1.2 $SA = 4\pi r^2$
$= 4(3{,}14) \times (35\text{ mm})^2$
$= 15\,386\text{ mm}^2$ (4)
4.1.3 Volume $= \frac{4}{3}\pi r^3$
$= \frac{4}{3}(3{,}14)(35\text{ mm})^3$
$= 179\,503{,}33\text{ mm}^3$
≈ 180 ml (5)
4.2.1 tetrahedron (2)
4.2.2 4 (2)
4.2.3 4 (2)
[19]

Question 5

5.1.1 30 learners (2)

5.1.2 13; 24; 28; 30; 34; 37; 38; 38; 40; 44; 45; 45; 49; 50; 52; 55; 55; 57; 58; ; 63; 64; 66; 66; 66; 70; 77; 80; 85; 86 (3)

5.1.3 Range = 86 – 13 = 73 (2)

5.1.4 Mean = $\frac{\text{sum of scores}}{30}$

$= \frac{1\,520}{30}$

= 50,66

Median = $\frac{50 + 52}{2}$

= 51

Mode = 66 (5)

5.2.1

Code	Interval	Tally	Frequency
1	0–29	|||	3
2	30–39	𝍸	5
3	40–49	𝍸	5
4	50–59	𝍸 ||	7
5	60–69	𝍸	5
6	0–79	||	2
7	80–100	|||	3
TOTAL			30

(6)

5.2.2 8 (1)

5.2.3 $\frac{3}{80}$ (3)

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[Total: 100]