basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P1

EXEMPLAR 2012

MEMORANDUM

MARKS: 100

This memorandum consists of 7 pages.

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QUESTION 1

1.1.1	$(m-2n)(m^2-6mn-n^2)$ $=m^3-6m^2n-mn^2-2m^2n+12mn^2+2n^3$ $=m^3-8m^2n+11mn^2+2n^3$	✓ expansion ✓ m^3 ; $+2n^3$ ✓ $-8m^2n+11mn^2$ (3)
1.1.2	$\frac{x^3+1}{x^2-x+1}-\frac{4x^2-3x-1}{4x+1}$ $=\frac{(x+1)(x^2-x+1)}{x^2-x+1}-\frac{(4x+1)(x-1)}{4x+1}$ $=x+1-(x-1)$ $=2$	✓✓ $(x+1)(x^2-x+1)$ ✓ $(4x+1)(x-1)$ ✓ $x+1-(x-1)$ ✓answer (5)
1.2.1	$6x^2-7x-20$ $=(3x+4)(2x-5)$	✓ $(3x+4)$ ✓ $(2x-5)$ (2)
1.2.2	$a^2+a-2ab-2b$ $=a(a+1)-2b(a+1)$ $=(a+1)(a-2b)$	✓grouping ✓ $(1+a)$ ✓ $(a-2b)$ (3)
1.3	Since $7^2=49$ and $8^2=64$ and $49<51<64$, $7<\sqrt{51}<8$ i.e. $\sqrt{51}$ lies between 7 and 8	✓ $49<51<64$ ✓ answer (2)
1.4	Let $x=0,\dot{2}\dot{4}\dot{5}$ Then $1000x=245,\dot{2}\dot{4}\dot{5}$ i.e. $999x=245$ i.e. $x=\frac{245}{999}$ Therefore x is a rational number.	✓ introduce variable ✓ $1000x=245,\dot{2}\dot{4}\dot{5}$ ✓ $999x=245$ ✓ $x=\frac{245}{999}$ (4) **[19]**

QUESTION 2

2.1.1	$x^2 - 4x = 21$ $x^2 - 4x - 21 = 0$ $(x+3)(x-7) = 0$ $x+3=0$ or $x-7=0$ $x=-3$ $x=7$	✓ standard form ✓ factors ✓ answers (3)
2.1.2	$96 = 3x^{\frac{5}{4}}$ $32 = x^{\frac{5}{4}}$ $x = (32)^{\frac{4}{5}}$ $= \left(2^5\right)^{\frac{4}{5}}$ $= 2^4$ $= 16$	✓ $32 = x^{\frac{5}{4}}$ ✓ $x = (32)^{\frac{4}{5}}$ ✓ answer (3)
2.1.3	$R = \frac{2\sqrt{x}}{3S}$ $\frac{3RS}{2} = \sqrt{x}$ $x = \frac{9R^2S^2}{4}$	✓ Multiply by 3S and divide by 2 ✓ Squaring both sides (2)
2.2	$6q + 7p = 3$.....Equation 1 $2q + p = 5$.....Equation 2 $6q + 7p = 3$.....Equation 1 $14q + 7p = 35$.....multiply Equation 2 with 7 .....Equation 3 Equation 3 – Equation 1: $8q = 32$ $q = 4$ $2(4) + p = 5$ $p = -3$	✓ $14q + 7p = 35$ ✓ $8q = 32$ ✓ $q = 4$ ✓ substitution ✓ $p = -3$ (5) **[13]**

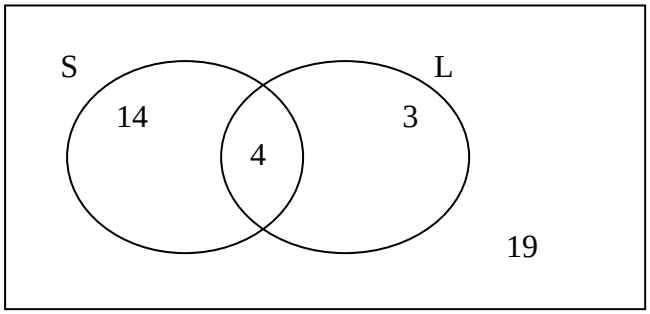
QUESTION 3

3.1.1	10 ; 6 ; 2	✓ 10 ✓ 6 ✓ 2 (3)
3.1.2	$d = -4$ $T_n = -4n + 14$	✓ $-4n$ ✓ 14 (2)
3.1.3	$-4n + 14 < -31$ $-4n < -45$ $n > 11{,}25$ $n = 12$	✓ $-4n + 14 < -31$ ✓ $n > 11{,}25$ ✓ answer (3)
3.2	$T_n = 6n$ $T_{13} = 6(13)$ $= 78$ **OR** $T_n = 3n$ $T_{26} = 3(26)$ $= 78$	✓ $6n$ ✓ substitution of 13 ✓ answer (3) **OR** ✓ $3n$ ✓ substitution of 26 ✓ answer (3) **[11]**

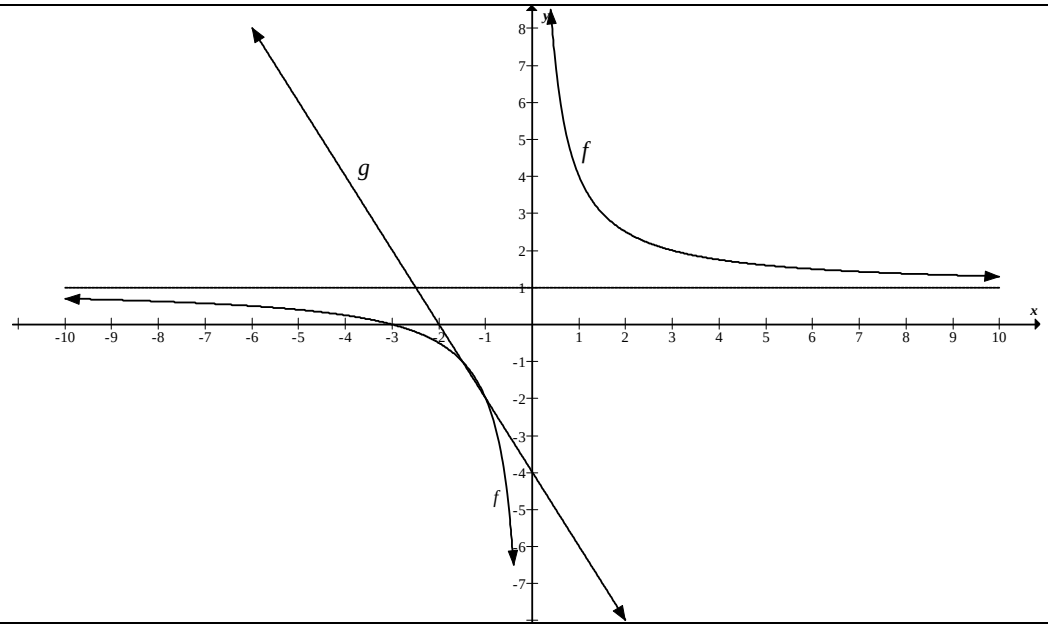
QUESTION 4

4.1	$A = P(1+i)^n$ $= 4500\left(1+\frac{4.25}{100}\right)^{2.5}$ $= R\ 4993.47$	✓$n = 2.5$ ✓substitution ✓answer (3)
4.2.1	Loan amount = R5 999 – R600 = R5 399 Total amount owed = 5 399[1+(0,08)(1,5)] = R6 046,88 Monthly instalment = $\frac{6046.88}{18}$ = R335,94	✓ $y = 0$ ✓5 399 ✓$n = 1{,}5$ ✓Substitution ✓R6 046,88 ✓ ÷ 18 ✓R335,94 (6)
4.2.2	R6 046,88 - R5 399 = R647,88	✓ answer (1)
4.3	1 kg = 1 000 g $\frac{1000}{28{,}35}$ = 35,27336861… ounces 35,27336861… x 978,34 x 8,79 = R303 337,16	✓conversion ✓division ✓multiplication ✓answer (4) **[14]**

QUESTION 5

5.1.1	$A \cap B$ **OR** A and B	✓ answer (1)
5.1.2	$A^{/}$ **OR** not A	✓ answer (1)
5.2	B	✓ answer (1)
5.3.1	19 learners are right-handed and do not play soccer.	✓ answer (1)
5.3.2		✓ 15 ✓ 4 ✓ 2 ✓ 19 (4)
5.3.3 (a)	$P(L \text{ OR } S) = \frac{14+4+3}{40}$ $= \frac{21}{40}$	✓ 15 + 4 + 2 ✓ 40 ✓ answer (3)
5.3.3 (b)	$P(R \text{ AND } S) = \frac{14}{40}$ $= \frac{7}{20}$	✓ $\frac{15}{40}$ ✓ answer (2) **[13]**

QUESTION 6

6.1		✓shape of f ✓ x-int of f ✓ x-intercept of g ✓ y-intercept of g (4)
6.2	$x = 0$ and $y = 1$	✓ answer ✓ answer (2)
6.3	$(-\infty ; 0) \cup (0 ; \infty)$	✓ values ✓ notation (2)
6.4	$\frac{3}{x}+1=-2x-4$ $\frac{3}{x}=-2x-5$ $3=-2x^2-5x$ $2x^2+5x+3=0$ $(2x+3)(x+1)=0$ $x=-\frac{3}{2}$ or $x=-1$	✓$\frac{3}{x}+1=-2x-4$ ✓ standard form ✓ factors ✓✓ answers (5)
6.5	$-1 \le -2x-4 < 3$ $3 \le -2x < 7$ $-1,5 \ge x > -3,5$ $-3,5 < x \le -1,5$ OR $x \in (-3,5 ; -1,5]$	✓ $-1 \le -2x-4 < 3$ ✓ $3 \le -2x < 7$ ✓ answer (3)
6.6	$k(x) = 2(-2x-4)$ $= -4x-8$ y-intercept: $(0 ; -8)$	✓ equation of $k(x)$ ✓ answer (2)
6.7	x-intercept: (2 ; 0) y-intercept: (0 ; – 4)	✓ x-intercept ✓ y-intercept (2) **[20]**

QUESTION 7

7.1	C(– 2 ; 0)	✓ answer (1)
7.2	$f(x) = ax^2 + q$ $f(x) = a\left(x^2 - 4\right)$ $2{,}5 = a((-3)^2 - 4)$ $2{,}5 = 5a$ $a = \frac{1}{2}$ $f(x) = \frac{1}{2}\left(x^2 - 4\right)$	✓ $f(x) = a\left(x^2 - 16\right)$ ✓ substitution of (– 5 ; 2,25) ✓ answer (3)
7.3	Range of *f*: [–2 ; ∞)	✓ answer (1)
7.4	Range of *h*: (–∞ ; 0]	✓ notation ✓ critical values (2)
7.5	$g(x) = b^x - 4$ $0 = b^2 - 4$ $4 = b^2$ $b = 2$ $g(x) = 2^x - 4$	✓ $g(x) = b^x - 4$ ✓ substitution ✓ answer (3) **[10]**

TOTAL: 100

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