



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.

QUESTION 1

1.1.1	$(m - 2n)(m^2 - 6mn - n^2)$ $= m^3 - 6m^2n - mn^2 - 2m^2n + 12mn^2 + 2n^3$ $= m^3 - 8m^2n + 11mn^2 + 2n^3$	<ul style="list-style-type: none"> ✓ expansion ✓ m^3 ; $+2n^3$ ✓ $-8m^2n + 11mn^2$ 	(3)
1.1.2	$\frac{x^3 + 1}{x^2 - x + 1} - \frac{4x^2 - 3x - 1}{4x + 1}$ $= \frac{(x+1)(x^2 - x + 1)}{x^2 - x + 1} - \frac{(4x+1)(x-1)}{4x+1}$ $= x+1 - (x-1)$ $= 2$	<ul style="list-style-type: none"> ✓✓ $(x+1)(x^2 - x + 1)$ ✓ $(4x+1)(x-1)$ ✓ $x+1 - (x-1)$ ✓ answer 	(5)
1.2.1	$6x^2 - 7x - 20$ $= (3x + 4)(2x - 5)$	<ul style="list-style-type: none"> ✓ $(3x + 4)$ ✓ $(2x - 5)$ 	(2)
1.2.2	$a^2 + a - 2ab - 2b$ $= a(a + 1) - 2b(a + 1)$ $= (a + 1)(a - 2b)$	<ul style="list-style-type: none"> ✓ grouping ✓ $(1 + a)$ ✓ $(a - 2b)$ 	(3)
1.3	<p>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</p>	<ul style="list-style-type: none"> ✓ $49 < 51 < 64$ ✓ answer 	(2)
1.4	<p>Let $x = 0,2\dot{4}5$ Then $1000x = 245,2\dot{4}5$ i.e. $999x = 245$ i.e. $x = \frac{245}{999}$ Therefore x is a rational number.</p>	<ul style="list-style-type: none"> ✓ introduce variable ✓ $1000x = 245,2\dot{4}5$ ✓ $999x = 245$ ✓ $x = \frac{245}{999}$ 	(4) [19]

QUESTION 2

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

QUESTION 3

3.1.1	10 ; 6 ; 2	<ul style="list-style-type: none"> ✓ 10 ✓ 6 ✓ 2 	(3)		
3.1.2	$d = -4$ $T_n = -4n + 14$	<ul style="list-style-type: none"> ✓ $-4n$ ✓ 14 	(2)		
3.1.3	$-4n + 14 < -31$ $-4n < -45$ $n > 11,25$ $n = 12$	<ul style="list-style-type: none"> ✓ $-4n + 14 < -31$ ✓ $n > 11,25$ ✓ answer 	(3)		
3.2	$T_n = 6n$ $T_{13} = 6(13)$ $= 78$	OR	$T_n = 3n$ $T_{26} = 3(26)$ $= 78$	<ul style="list-style-type: none"> ✓ $6n$ ✓ substitution of 13 ✓ answer 	(3)
		OR		<ul style="list-style-type: none"> ✓ $3n$ ✓ substitution of 26 ✓ answer 	(3)
					[11]

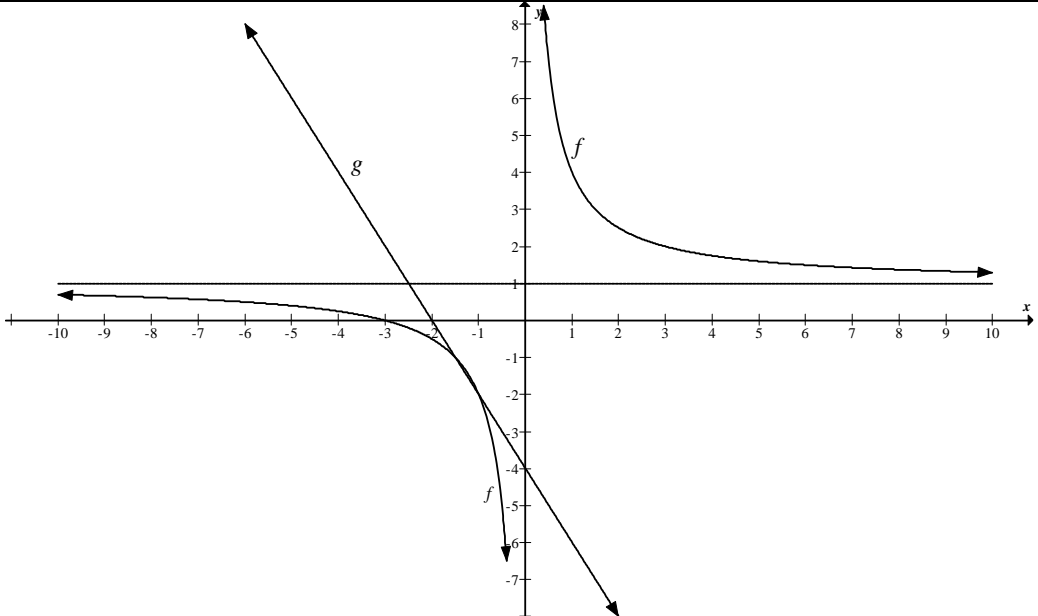
QUESTION 4

4.1	$A = P(1+i)^n$ $= 4500 \left(1 + \frac{4.25}{100}\right)^{2.5}$ $= R\ 4993.47$	<ul style="list-style-type: none"> ✓ $n = 2.5$ ✓ 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 = $\frac{6046.88}{18}$ $= R335,94$	<ul style="list-style-type: none"> ✓ $y = 0$ ✓ 5 399 ✓ $n = 1,5$ ✓ Substitution ✓ R6 046,88 ✓ $\div 18$ ✓ R335,94 	(6)
4.2.2	$R6\ 046,88 - R5\ 399$ $= R647,88$	<ul style="list-style-type: none"> ✓ answer 	(1)
4.3	$1\ \text{kg} = 1\ 000\ \text{g}$ $\frac{1000}{28,35} = 35,27336861\dots$ ounces $35,27336861\dots \times 978,34 \times 8,79$ $= R303\ 337,16$	<ul style="list-style-type: none"> ✓ 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	<p>A Venn diagram with two overlapping circles, S and L, inside a rectangular universal set. Circle S is on the left and contains the number 14. Circle L is on the right and contains the number 3. The intersection of S and L contains the number 4. The number 19 is written outside the circles but inside the universal set rectangle.</p>	✓ 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

<p>6.1</p>		<ul style="list-style-type: none"> ✓ shape of f ✓ x-int of f ✓ x-intercept of g ✓ y-intercept of g <p style="text-align: right;">(4)</p>
<p>6.2</p>	<p>$x = 0$ and $y = 1$</p>	<ul style="list-style-type: none"> ✓ answer ✓ answer <p style="text-align: right;">(2)</p>
<p>6.3</p>	<p>$(-\infty ; 0) \cup (0 ; \infty)$</p>	<ul style="list-style-type: none"> ✓ values ✓ notation <p style="text-align: right;">(2)</p>
<p>6.4</p>	$\frac{3}{x} + 1 = -2x - 4$ $\frac{3}{x} = -2x - 5$ $3 = -2x^2 - 5x$ $2x^2 + 5x + 3 = 0$ $(2x + 3)(x + 1) = 0$ $x = -\frac{3}{2} \text{ or } x = -1$	<ul style="list-style-type: none"> ✓ $\frac{3}{x} + 1 = -2x - 4$ ✓ standard form ✓ factors ✓✓ answers <p style="text-align: right;">(5)</p>
<p>6.5</p>	$-1 \leq -2x - 4 < 3$ $3 \leq -2x < 7$ $-1,5 \geq x > -3,5$ $-3,5 < x \leq -1,5$ <p style="text-align: center;">OR $x \in (-3,5 ; -1,5]$</p>	<ul style="list-style-type: none"> ✓ $-1 \leq -2x - 4 < 3$ ✓ $3 \leq -2x < 7$ ✓ answer <p style="text-align: right;">(3)</p>
<p>6.6</p>	$k(x) = 2(-2x - 4)$ $= -4x - 8$ <p>y-intercept: $(0 ; -8)$</p>	<ul style="list-style-type: none"> ✓ equation of $k(x)$ ✓ answer <p style="text-align: right;">(2)</p>
<p>6.7</p>	<p>x-intercept: $(2 ; 0)$ y-intercept: $(0 ; -4)$</p>	<ul style="list-style-type: none"> ✓ x-intercept ✓ y-intercept <p style="text-align: right;">(2) [20]</p>

QUESTION 7

7.1	$C(-2; 0)$	✓ answer (1)
7.2	$f(x) = ax^2 + q$ $f(x) = a(x^2 - 4)$ $2,5 = a((-3)^2 - 4)$ $2,5 = 5a$ $a = \frac{1}{2}$ $f(x) = \frac{1}{2}(x^2 - 4)$	✓ $f(x) = a(x^2 - 16)$ ✓ substitution of $(-5; 2,25)$ ✓ answer (3)
7.3	Range of f : $[-2; \infty)$	✓ answer (1)
7.4	Range of h : $(-\infty; 0]$	✓ 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