



# 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	$(m - 2n)(m^2 - 6mn - n^2)$ $= m^3 - 6m^2n - mn^2 - 2m^2n + 12mn^2 + 2n^3$ $= m^3 - 8m^2n + 11mn^2 + 2n^3$	✓ 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 $x = 0,2\dot{4}\dot{5}$ Then $1000x = 245,2\dot{4}\dot{5}$ i.e. $999x = 245$ i.e. $x = \frac{245}{999}$ Therefore $x$ is a rational number.	✓ introduce variable ✓ $1000x = 245,2\dot{4}\dot{5}$ ✓ $999x = 245$ ✓ $x = \frac{245}{999}$ (4) <b>[19]</b>

**QUESTION 2**

2.1.1	$x^2 - 4x = 21$ $x^2 - 4x - 21 = 0$ $(x + 3)(x - 7) = 0$ $x + 3 = 0 \quad \text{or} \quad x - 7 = 0$ $x = -3 \quad \quad \quad x = 7$	✓ standard form ✓ factors  ✓ answers  (3)
2.1.2	$96 = 3x^{\frac{5}{4}}$ $32 = x^{\frac{5}{4}}$ $x = (32)^{\frac{4}{5}}$ $= (2^5)^{\frac{4}{5}}$ $= 2^4$ $= 16$	✓ $32 = x^{\frac{5}{4}}$ ✓ $x = (32)^{\frac{4}{5}}$  ✓ 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) <b>[13]</b>

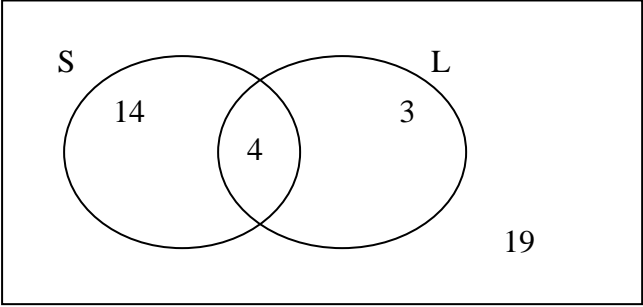
**QUESTION 3**

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	$T_n = 6n$ $T_{13} = 6(13)$ $= 78$ <b>OR</b> $T_n = 3n$ $T_{26} = 3(26)$ $= 78$	✓ $6n$ ✓ substitution of 13 ✓ answer (3) <b>OR</b> ✓ $3n$ ✓ substitution of 26 ✓ answer (3) <b>[11]</b>

**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 ✓ $\div 18$ ✓ R335,94 (6)
4.2.2	$R6\ 046,88 - R5\ 399$ $= R647,88$	✓ answer (1)
4.3	$1\ \text{kg} = 1\ 000\ \text{g}$ $\frac{1000}{28,35} = 35,27336861\dots\ \text{ounces}$ $35,27336861\dots \times 978,34 \times 8,79$ $= R303\ 337,16$	✓ conversion ✓ division ✓ multiplication ✓ answer (4) <b>[14]</b>

**QUESTION 5**

5.1.1	$A \cap B$ <b>OR</b> A and B	✓ answer (1)
5.1.2	$A'$ <b>OR</b> 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) <b>[13]</b>

**QUESTION 6**

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

**[20]**

