education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 10

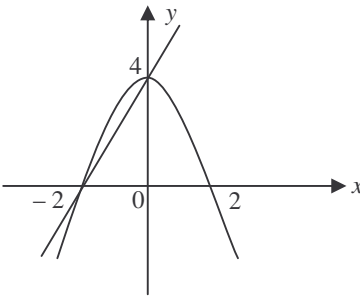**MATHEMATICS P1**

NOVEMBER 2006

This memorandum consists of 6 pages.

1.1.1 $(3x-2)(x^2+1)-2$ $=3x^3-2x^2+3x-2-2$ $=3x^3-2x^2+3x-4$ (3)	√√ Removing brackets/Simplification √ Grouping of like terms
1.1.2 $\dfrac{(2^2\times 3)^{x+1}}{2^{2x}\times 3^x}$ $=\dfrac{2^{2x+2}\times 3^{x+1}}{2^{2x}\times 3^x}$ $=2^{2x+2-2x}\times 3^{x+1-x}$ $=2^2\times 3^1$ $=12$ (4)	√ Application of exponent law √ Application of exponent law √ Simplification √ answer 4
1.1.3 $=\dfrac{(x-1)(x+1)}{3}\times\dfrac{1}{x-1}-\dfrac{1}{2}$ $=\dfrac{x+1}{3}-\dfrac{1}{2}$ $=\dfrac{2x+2-3}{6}$ $=\dfrac{2x-1}{6}$ (4)	√ factorising √ Cancelling √ simplification √ answer
1.2. $(x+2)^2=x^2+4x+4$ $x^2-x+4=x^2-x+4+5x$ ∴ Add $5x$ (3)	√ Expansion √ Equivalent expression √ $5x$
1.3 $2000=2\times M^3\times N^3$ $1000=(M\times N)^3$ $10^3=(M\times N)^3$ $10=M\times N$ (3)	√ dividing both sides by 2 √ writing as a cube √ answer 10
1.4	

1.4.1 $3x^2 - 5x - 2$ $(3x+1)(x-2)$ $\hspace{2cm}$ (2)	√√ One for each factor.
1.4.2 $n^2 + 3n - 5n - 15$ $= n(n+3) - 5(n+3)$ $= (n+3)(n-5)$ $\hspace{2cm}$ (3)	√ removal of common factor √√ One for each factor
1.5 $\sqrt{4} = 2$; $\sqrt{\dfrac{25}{9}} = \dfrac{5}{3}$; $\sqrt{9} = 3$ $\hspace{2cm}$ (3)	√√ √One for each answer (Any mathematically correct answer)

QUESTION TWO

2.1.1 $2x(x-1) = 4$ $x(x-1) = 2$ $x^2 - x - 2 = 0$ $(x+1)(x-2) = 0$ $\therefore x = -1 \; or \; x = 2$ $\hspace{2cm}$ (4)	√ Divding by 2 √ standard form √ factoring trinomial √ both answers
2.1.2 By trial and error $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ Therefore x is between 3 and 4 By trial and error answer is $x = 3.9$ $\hspace{2cm}$ (3)	√ Calculating powers √ Estimation, between values √ Estimation of value
2.2 $-2 \le x - 1 < 3$ $-1 \le x < 4$ $\hspace{4cm}$ (4)	√ √ solving for x √ √ Number line representation

QUESTION 3	
3.1.1 $8 \times 2 = 16$ (2^4) (1)	$\sqrt{}$ answer
3.1.2 $16 \times 2 = 32$ (2^5) (1)	$\sqrt{}$ answer
3.1.3 The number of letters sent will always be a power of 2. The power is always 1 less than the stage. 3.1.4 nth stage = 2^{n-1}. (2)	$\sqrt{}$ $\sqrt{}$ Any acceptable explanation . $\sqrt{}\sqrt{}$

3.2   Let cost of Chocolate be x
       Let cost of Chips be y
       Then $2x + 4y = 32$ ………………(1)
             $3x + 8y = 58$ ………………..(2)
Now (1)×2 : $4x + 8y = 64$ ………………. (3)
(3) − (2)   x   = 6
Substituting x = 6 in (1) we have
       $2(6) + 4y = 32$
             $4y = 20$
             $y = 5$
$\therefore$ Cost of Chocolate = R6 and Cost of Chips = R5   (6)
	$\sqrt{}$ Equation (1)
	$\sqrt{}$ Equation (2)
	$\sqrt{}$ Equation (3)
	$\sqrt{}$ x = R6
	$\sqrt{}$ Substitution for x
	$\sqrt{}$ Cost of Chips, y

QUESTION 4	
4.1 Simple Interest = $\dfrac{\mathrm{P}r\,t}{100}$ $\dfrac{2750 \times 8.5 \times 4}{100} = 935$ $\therefore$ Zaida receives R2750 + R935 = R3685 (4)	$\sqrt{}$ Correct Formula $\sqrt{}$ Correct substitution $\sqrt{}$ SI $\sqrt{}$ Answer

4.2
 	
    $A = P(1 + \dfrac{r}{100})^n$
 	
    $= 12500(1,055)^5$
 	
    $= 16337\ people$
 	
                         (5)
	$\sqrt{}$ Correct formula
	$\sqrt{}$ $\sqrt{}\sqrt{}$ Substitution in formula
	$\sqrt{}$ Correct answer

4.3.1 Total need in rands is 3 x R17 000 = R51 000
      $\therefore$ Amount needed in Nigerian currency is
      $\dfrac{51000}{18.85}$ = 2705.57 Naira   (3)
	$\sqrt{}$ Rand value R51 000
	$\sqrt{}$ $\sqrt{}$ Correct conversion

QUESTION 5	

5.1.1 Graph (6)		$\sqrt{}$ Shape – parabola $\sqrt{}\sqrt{}$ x-intercepts $\sqrt{}$ y - intercept $\sqrt{}$ shape straight line $\sqrt{}$ x or y intercept
5.1.2 $x < -2$ or $x > 0$	(3)	$\sqrt{}\sqrt{}$ for each critical value ("or") $\sqrt{}$ inequality signs
5.1.3 $p(x) = x^2 - 4$	(2)	$\sqrt{}\sqrt{}$ equation
5.2.1 A(-1 ; 3) ; B(0 ; 1)	(2)	$\sqrt{}\ \sqrt{}$ 1 for each
5.2.2 $x \in R$	(1)	$\sqrt{}$
5.2.3 $y = 3^x$	(2)	$\sqrt{}\sqrt{}$ equation.
5.2.3 y = 2	(2)	$\sqrt{}\sqrt{}$ correct equation
QUESTION 6		
6.1 a = -2		$\sqrt{}$ q = -2
6.2 $h(x) = \tan x + 2$		$\sqrt{}\sqrt{}$ I mark for each term
6.3 $x = 0°$ or $x = 360°)$		$\sqrt{}\sqrt{}$ I mark for each value
6.5 $x = 180°$		$\sqrt{}$ correct answer
		$\sqrt{}\sqrt{}$ 1 mark for each answer
		$\sqrt{}$ correct x value

QUESTION 7	
7.1 Maximum – about 0.4 Kw Minimum – about 3 Kw	√ √
7.2 Increasing – between 04:00 and 10:00 between 10:00 and 18:00 Decreasing – between 07:30 and 10:00 between 20:00 and 24:00	These are estimations in terms of the graph – allow slight discrepancies 1 mark for each period
7.3 Between 16:00 and 18:00	√√
7.4 $$Ave.\,\text{rate} = \frac{1.5 - 0.5}{24}$$ $$= 0.04\text{ Kw}$$	√ √√
7.5 No – Acceptible motivation in terms of given data	√ No √√ Motivation