GRADE 11 NOV EXAM P1 MEMO

Question 1

a. $x = \frac{8 \pm \sqrt{64+36}}{6}$ ✓

$= \frac{8 \pm \sqrt{100}}{6}$

$x = 3$ ✓ or $x = -\frac{1}{3}$ ✓ 3

bi $16^{-\frac{1}{4}} + (-10)^0$

$= (2^4)^{-\frac{1}{4}} + 1$ ✓

$= 1\frac{1}{2}$ ✓ 3

ii $\sqrt[3]{3a^2} \times \sqrt[3]{9a^4}$

$= \sqrt[3]{27a^6}$ ✓

$= 3a^2$ ✓ 3

iii $\frac{x^2+5x+6}{3x+6}$

$= \frac{(x+2)(x+3)}{3(x+2)}$ ✓

$= \frac{x+3}{3}$ ✓ 3

iv. $\frac{6^{n+2} \times 10^{n-2}}{4^n \times 15^{n-2}}$

$= \frac{2^{n+2} \cdot 3^{n+2} \times 2^{n-2} \cdot 5^{n-2}}{2^{2n} \times 3^{n-2} \cdot 5^{n-2}}$

$= 2^{n+2+n-2-2n} \cdot 3^{n+2-(n-2)} 5^{n-2-(n-2)}$

$= 2^0 \cdot 3^4 \cdot 5^0$ ✓

$= 81$ ✓ 6

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b. $x^2 - 3x - 6 = 0$

$x = \frac{3 \pm \sqrt{9-4(1)(-6)}}{2}$ ✓

$x = 4{,}37$ ✓ $x = -1{,}37$ ✓ 3

c. $2x^{\frac{1}{2}} - 5x^{\frac{1}{4}} - 3 = 0$

$(2x^{\frac{1}{4}} + 1)(x^{\frac{1}{4}} - 3) = 0$ ✓

$x^{\frac{1}{4}} \neq -\frac{1}{2}$ ✓ or $x^{\frac{1}{4}} = 3$ ✓

$x = \frac{1}{16}$ ✓ N.V $x = 81$ ✓ 5

d. $\sqrt{x+4} - x = 4$

$\sqrt{x+4} = x+4$ ✓

$x+4 = x^2 + 8x + 16$ ✓

$0 = x^2 + 7x + 12$ ✓

$(x+3)(x+4) = 0$ ✓

$x = -3$ ✓ or $x = -4$ ✓ 6

e. $x+2 = \frac{25}{x+2}$

$x^2 + 4x + 4 = 25$ ✓

$x^2 + 4x - 21 = 0$ ✓

$(x+7)(x-3) = 0$ ✓

$x = -7$ ✓ or $x = 3$ ✓ 5

f. $x(x-3) \geq -2$

$x^2 - 3x + 2 \geq 0$ ✓

$(x-2)(x-1) \geq 0$

$x \leq 1$ ✓ or $x \geq 2$ ✓ 4

[21]

Question 2

2a. $2 \cdot 3^{3x+1} = 162$

$3^{3x+1} = 81$ ✓ $= 3^4$ ✓

$3x+1 = 4$ ✓

$x = 1$ ✓ 4

Question 3

ai $7;\ 19;\ 37;\ 61$

$+12 \quad +18 \quad +24$

$+6 \quad +6$

$91;\ 127$ ✓✓ 2

ii. $T_n = ax^2 + bx + c$

$a = \frac{b}{2} = 3$ ✓✓

$b = 12 - 3(3)$

$= 3$ ✓✓

$c = 7 - (3+3)$

$= 1$ ✓✓

$T_n = 3x^2 + 3x + 1$ 6

b. $2x+2 - x = 5x+3 - (2x+2)$ ✓ ✓

$x - 3x = -1$

$-2x = -1$

$x = \frac{1}{2}$ ✓

$\frac{1}{2};\ 3;\ 5\frac{1}{2}$ ✓ ✓ 5

ci $T_n = 1,6n$ ✓✓

$S_{40} = \frac{40}{2}(1,6 + 64)$ ✓ ✓ ✓ form

$= 1312$ km ✓ 6

ii $T_{30} = 1,6(30)$ ✓

$= 48$ km ✓ 2

di $S_{12} = 3^{13} - 6$ ✓

$= 1594\,317$ ✓ 2

ii $T_{12} = S_{12} - S_{11}$ ✓

$= 1594\,317 - 531\,435$ ✓

$= 1062\,882$ ✓ 3

iii. $T_n = S_n - S_{n-1}$ ✓

$= 3^{n+1} - 6 - (3^n - 6)$

$= 3^{n+1} - 3^n$ ✓

$= 3^n(3-1)$ ✓

$= 2.3^n$ ✓

$\therefore$ divisible by 2. ✓ 5

Question 4 [31]

4di $f(x) = 3x^2 + 6x$

$= 3(x^2 + 2x + (\frac{2}{2})^2 - (\frac{2}{2})^2)$ ✓ ✓

$= 3[(x+1)^2 - 1]$ ✓

$= 3(x+1)^2 - 3$ ✓ 4

ii. TP: $(-1; -3)$ ✓ ✓

min: -3 2

bi $y = x^2 - 4$; $2x = y + 4$

$2x = x^2 - 4 + 4$ ✓

$0 = x^2 - 2x$

$0 = x(x-2)$ ✓

$x = 0$ ✓ or $x = 2$ ✓

$y = -4$ ✓ $y = 0$ ✓ 6

ii. Answer sheet 6

iii. $y = (x-3)^2 - 4$
$= x^2 - 6x + 5$ ✓ ✓ 3

[21]

Question 5

a. v ✓

b. vi ✓

c. ii ✓

[3]

Question 6

a. $p = 2$ ✓ $q = 1$ ✓
$f(x) = a(x-2) + 1$
$f(3) = a(3-2) + 1 = 3$ ✓
$a + 1 = 3$
$a = 2$ ✓ 4

b. $x = 2$ ✓ ; $y = 1$ ✓ 2

c. $y = x - 1$ ✓ or $y = -x + 3$ ✓ 2

d. $y \geq 2$ ✓ ; $y \in \mathbb{R}$ ✓ 2

e. $f(0) = 2(0-2)^2 + 1$ ✓
$= 9$ ✓ 2

f. $(2; 3]$ ✓ ✓ 2

[14]

Question 7

a. $A = P(1-i)^n$ ✓
$= 24\,000(1 - 18\%)^3$ ✓
$= R\ 13\ 232,83$ ✓ 3

b. $i_{eff} = \left(1 + \frac{14\%}{12}\right)^{12} - 1$ ✓ ✓
$= 0,1493\ldots$
$= 14,93\ \%$ ✓ 3

c. $2x = x(1 + 8,5\% \times n)$ ✓
$1 + 8,5\% \times n = 2$ ✓
$n = \frac{2-1}{8,5\%}$ ✓ $= 11,764$
$= 12$ years ✓ 4

d. $A_9 = P(1+i)^n$
$= 2850\left(1 + \frac{8\%}{4}\right)^{36}$ ✓
$= R5813,68$ ✓

$A_{15} = 5813,68\left(1 + \frac{10,5\%}{12}\right)^{72}$ ✓
$= R10\ 885,95$ ✓ 6

[16]

Question 8

a. $\frac{550}{1000} = 0,55$ ✓ ✓ 2

b. $\frac{450}{600} = 0,75$ ✓ ✓ 2

c. $\frac{100}{400} = 0,25$ ✓ ✓ 2

[6]

Question 9

a. 14 ✓

b. $160 - 24 = 136$ ✓✓ 2

c. $16 + 22 + 28 + 14 = 80$ ✓✓ 2

d. $38 - x + x + 34 - x + 80 = 136$ ✓✓✓

$-x = -152 + 136$

$x = 16$ ✓ 3

[8]

Question 10

$C = 2\pi x$ ✓

Per of square $= 200 - 2\pi x$ ✓

Side of square $= 50 - \frac{\pi x}{2}$ ✓

Area of square:

$\left(50 - \frac{\pi x}{2}\right)^2$ ✓

$= 2500 - 50\pi x + \frac{\pi^2 x^2}{4}$ ✓✓

[6]

Name:_____

Question 4bii.