MOONTLIKE ANTWOORDE VIR: FUNCTIONAL MATHS SG

Vraag 1 | Question 1:

1.1.1 $T_n = -3n + 2$

$T_1 = -3(1) + 2$

$= -1$ ①

$T_2 = -3(2) + 2$

$= -4$ ①

$T_3 = -3(3) + 2$

$= -7$ ①

1.1.2 $T_{12} = a + 11d$ ①

$= -1 + 11(-3)$ ①

$= -1 - 33$

$= -34$ ①

1.2.1 $d = T_2 - T_1$

$= 3x + 3 - (2x + 1)$

$= 3x + 3 - 2x - 1$

$d = x + 2$ ①

$d = T_3 - T_2$

$= 7x - 1 - (3x + 3)$

$= 7x - 1 - 3x - 3$

$d = 4x - 4$ ①

$\therefore x + 2 = 4x - 4$ ①

$\therefore -3x = -6$

$\therefore x = 2$ ① (4)

1.2.2 $T_1 = 2(2) + 1 = 5$ ①

$T_2 = 3(2) + 3$ ①

$= 9$

$T_3 = 7(2) - 1$ ①

$= 13$

1.2.3 $d = 4$ ①

1.2.4 $S_n = \frac{n}{2}[2a + (n-1)d]$ ①

$S_{12} = \frac{12}{2}[2(5) + (12-1)4]$ ① ①

$= 6[10 + 11(4)]$

$= 6[10 + 44]$ ①

$= 6[54]$

$= 324$ ①

(3)

1.3 $T_n = a + (n-1)d$ ①

$\therefore -34 = 14 + (n-1)(-6)$ ①

$\therefore -34 = 14 - 6n + 6$

$\therefore 6n = 54$

$\therefore n = 9$ ① (4)

Vraag 2 | Question 2:

2.1 $T_8 = ar^7$ ①

$= 2\left(\frac{1}{2}\right)^7$ ①

$= 2\left(\frac{1}{128}\right)$ ①

$= \frac{2}{128}$

$= \frac{1}{64}$ ① (4)

2.2.1 $T_6 = -64$ ①

$\therefore ar^5 = -64 \ldots .1$

$T_3 = 8$ ①

$ar^2 = 8 \ldots .2$

1 ÷ 2 :

$\frac{ar^5}{ar^2} = \frac{-64}{8}$ ①

$\therefore r^3 = -8$ ①

$\therefore r = \sqrt[3]{-8}$

$\therefore r = -2$ ① (3)

2.2.2 $a(-2)^3 = 8$ ①

$\therefore 4a = 8$

$\therefore a = 2$ ①

2.3 $S_n = \frac{a(r^n - 1)}{r - 1}$ ①

$S_7 = \frac{3(3^7 - 1)}{3 - 1}$ ①

$= \frac{3(2187 - 1)}{2}$ ①

$= \frac{3(2186)}{2}$

$= 3279$ ① (5)

Vraag 3 | Question 3:

3.1. $\frac{\log 81}{\log 27}$

$= \frac{4 \log 3}{3 \log 3}$ ①

$= \frac{4}{3}$ ① (2)

3.1.2 $3\log_6 2 + \log_6 4,5 - \log_6 10$

$= \log_6 \frac{2^3(4,5)}{10}$ ① ①

$= \log_6 \frac{36}{10}$ ①

$= \log_6 6^2$ ①

$= 2$ ① (5)

3.1.3 $\log_2 16 + \log_9 27 - \log_4 1$

$= 4\log_2 2 + \frac{\log 27}{\log 9}$ ① $- 0$ ①

$= 4$ ① $+ \frac{3\log 3}{2\log 3}$ ①

$= 4 + 3/2$ ①

$= 4 + 1\frac{1}{2}$

$= 5\frac{1}{2} \mid \frac{11}{2}$ ① (2)

3.2.1 $\log_6 (x+5) = 4$

$\therefore 2^4 = x + 5$ ①

$\therefore 16 = x + 5$ ①

$\therefore x = 11$ ① (3)

3.2.2 $\log_x 125 = 3$

$\therefore x^3 = 125$ ①

$\therefore x^3 = 5^3$ ①

$\therefore (x^3)^{1/3} = (5^3)^{1/3}$

$\therefore x = 5$ ① (3)

3.3 $4 \cdot 5^x = 28$

$\therefore 5^x = 7$ ①

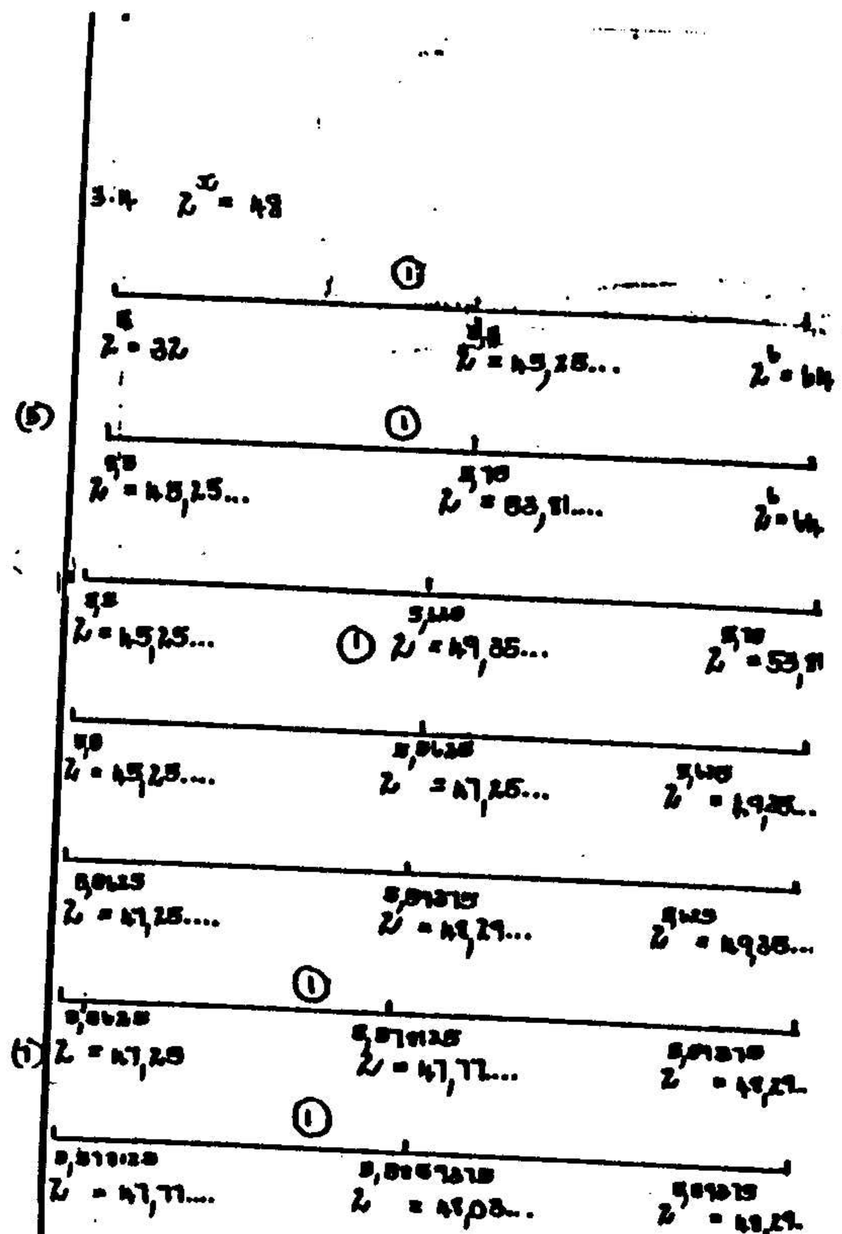
$\therefore \log_5 7 = x$ ①

$\therefore \frac{\log 7}{\log 5} = x$ ①

$\therefore x = 1,209 \ldots \therefore x = 1,21$ (4)

3.4 $2^x = 48$

(5)



∴ $x = 5,39$ ① (6)

Vraag 4:

4.1 $\lim_{x \to 3} 2x^2 - 5x + 2$

$= 2(3)^2 - 5(3) + 2$ ①

$= 2(9) - 15 + 2$

$= 5$ ① (2)

4.2 $F(x) = -2x^2$

$\therefore F'(x) = \lim_{h \to 0} \frac{F(x+h) - F(x)}{h}$ ①

$= \lim_{h \to 0} \frac{-2(x+h)^2 - (-2x^2)}{h}$ ①

$= \lim_{h \to 0} \frac{-2(x^2 + 2xh + h^2) + 2x^2}{1}$

$= \lim_{h\to 0} \frac{-2x^3 - 4x^2h - 2xh^2 + 2x^2}{h}$ ①

$= \lim_{h\to 0} \frac{-4x^2h - 2xh^2}{h}$ ①

$= \lim_{h\to 0} \frac{h(-4x - 2h)}{h}$

$= \lim_{h\to 0} -4x - 2h$ ①

$= -4x - 2(0)$

$= -4x.$ ①

4.3.1 $g(x) = -5$

$\therefore g'(x) = 0$ ①

(1)

4.3.2 $g(x) = -2x^3 + 12x^2 - 5x$ (f) (f) (f)

$\therefore g'(x) = -6x^2 + 24x - 5$ ① ①

(4)

4.3.3 $g(x) = (x-3)(x+2)$ ①

$= x^2 - x - 6$

$\therefore g'(x) = 2x - 1$ ① ①

(3)

4.4.1 $f(x) = 2x^2 - 3x + 5$

$\therefore f(2) = 2(2)^2 - 3(2) + 5$ ①

$= 2(4) - 6 + 5$

$= 8 - 6 + 5$

$= 7$ ①

4.4.2 $f'(x) = 4x - 3$ ①

4.4.3 $f'(2) = 4(2) - 3$

$= 5.$ ①

$M = S\ (3;7)$

4.4.4 $y - y_1 = m(x - x_1)$ ①

$\therefore y - 7 = 5(x - 2)$ ①

$\therefore y = 5x - 10 + 7$

$\therefore y = 5x - 3$ ①

(3)

✓

Vraag 5:

5.1 x-afsnitte: $f(x) = 0$

$0 = x^3 + 6x^2$

$\therefore 0 = x^2(x + 6)$ ①

$\therefore x = 0$ of $x = -6$

$\therefore B(0;0)$ ① $A(-6;0)$ ①

(4)

5.2 Vir draaipunte $f'(x) = 0$. ①

$\therefore 3x^2 + 12x = 0$ ①

$\therefore 3x(x + 4) = 0$ ①

$\therefore x = 0$ of $x = -4$ ①

n.o.t.

$f(-4) = (-4)^3 + 6(-4)^2$ ①

$= -64 + 6(16)$

$= -64 + 96$

$= 32$

$\therefore C(-4; 32)$ ①

(6)

✓

Vraag 6:

6.1 $27^{2/3} + \left(\frac{1}{3}\right)^{-2} - 5^0$

$= (3^3)^{2/3} + (3^{-1})^{-2} - 1$ ① ①

$= 3^2 + 3^2 - 1$ ① ①

$= 9 + 4 - 1$ ①

$= 12$ ①

(5)

6.2 $\frac{4^{n-2} \cdot 8^{1-n}}{2^{-n+2}}$

$= \frac{2^{2(n-2)} \cdot 2^{3(1-n)}}{2^{-n+2}}$ ①

$= \frac{2^{2n-4} \cdot 2^{3-3n}}{2^{-n+2}}$ ① ①

$= 2^{2n-4+3-3n+n-2}$

$= 2^{-3}$ ①

$= \frac{1}{8}$ ①

(5)

6.3

$\frac{2^{n+2} - 3 \cdot 2^{n+1}}{2^{n+1}}$

$= \frac{2^n \cdot 2^2 - 3 \cdot 2^n \cdot 2}{2^n \cdot 2}$ ① ①

$= \frac{2^n(4 - 3 \cdot 2)}{2^n \cdot 2}$ ①

$= \frac{4 - 6}{2}$ ①

$= \frac{-2}{2}$

$= -1$ ①

(6)

6.4 $\sqrt{18}\left(\sqrt{50} - \sqrt{8}\right)$

$= \sqrt{9 \cdot 2}\left(\sqrt{25 \cdot 2} - \sqrt{4 \cdot 2}\right)$

$= 3\sqrt{2}\left(5\sqrt{2} - 2\sqrt{2}\right)$ ① ① ①

$= 3\sqrt{2} \times 3\sqrt{2}$ ①

$= 9\sqrt{4}$

$= 9 \cdot 2$

$= 18.$ ①

(6)

✓

Vraag 7:

7.1 $5^{3x+1} = 25^{2x-4}$

$\therefore 5^{3x+1} = 5^{2(2x-4)}$ ①

$\therefore 5^{3x+1} = 5^{4x-8}$ ①

$\therefore 3x + 1 = 4x - 8$

$\therefore -x = -9$

$\therefore x = 9$ ①

(4)

7.2 $x^{3/4} = 27$

$\therefore \left(x^{3/4}\right)^{4/3} = \left(3^3\right)^{4/3}$ ① ①

$\therefore x = 3^4$

$\therefore x = 81$ ①

(3)

✓

Vraag 8:

8.1

x	-3	-2	-1	0	1	2	3
2^x	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8
$\left(\frac{1}{2}\right)^x$	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$2 \cdot 3^x$	$\frac{2}{27}$	$\frac{2}{9}$	$\frac{2}{3}$	2	6	18	54

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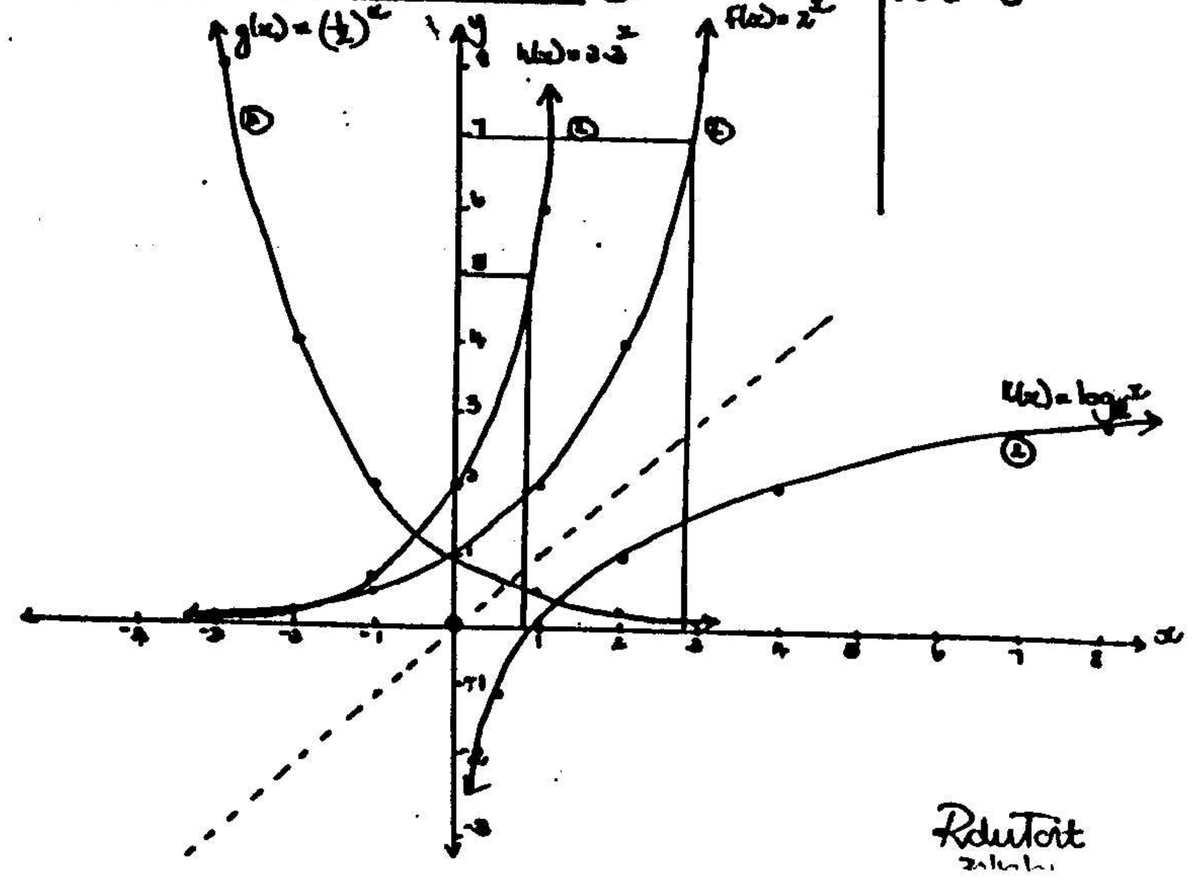

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8.2.1 $2,8$ ①

8.2.2 $0,8$ ①

8.2.3 1 ①

8.2.4 0 ①

(4)

Vraag 9:

9.1 $f(1) = (1)^3 + 2a(1)$ ①

$= 21$ ①

(2)

9.2 $f(2) = (2)^3 + 2a(2)$ ①

$= 64 + 160$

$= 224$ ①

(2)

9.3 Gemiddelde gradiënt $= \frac{f(b) - f(b_1)}{b_2 - b_1}$

$= \frac{224 - 21}{8 - 1}$ ①

$= \frac{203}{7}$

$= 29$ ① (2)

✓

Rdutoit