

SENIOR CERTIFICATE EXAMINATIONS/ SENIORSERTIFIKAAT-EKSAMEN NATIONAL SENIOR CERTIFICATE EXAMINATIONS/ NASIONALE SENIORSERTIFIKAAT-EKSAMEN

MATHEMATICS P1/WISKUNDE V1 MARKING GUIDELINES/NASIENRIGLYNE MAY/JUNE/MEI/JUNIE 2024

MARKS: 150 *PUNTE: 150*

These marking guidelines consist of 16 pages./ Hierdie nasienriglyne bestaan uit 16 bladsye.

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in all aspects of the marking memorandum.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.
- Volgehoue akkuraatheid is DEURGAANS op ALLE aspekte van die nasienriglyne van toepassing.

QUESTION 1/VRAAG 1

| 1.1.1 | $3x^2 + 5x = 0$ | |
|-------|---|--|
| | x(3x+5)=0 | $\checkmark x = 0$ |
| | $x = 0$ or $x = -\frac{5}{3}$ | $\checkmark x = -\frac{5}{3}$ |
| | $\begin{bmatrix} x-0 & \text{or} & x-\frac{\pi}{3} \end{bmatrix}$ | $\checkmark x = -\frac{5}{}$ |
| | | 3 |
| | | (2) |
| 1.1.2 | $4x^2 + 3x - 5 = 0$ | |
| | $-(3) \pm \sqrt{(3)^2 - 4(4)(-5)}$ | |
| | $x = \frac{-(3) \pm \sqrt{(3)^2 - 4(4)(-5)}}{2(4)}$ | ✓ correct substitution into |
| | · / | correct formula ✓ answer |
| | x = 0.80 or $x = -1.55$ | ✓ answer ✓ answer |
| | | (3) |
| 1.1.0 | (1)2 0 > 0 | (3) |
| 1.1.3 | $(x-1)^2 - 9 \ge 0$ | |
| | $x^2 - 2x - 8 \ge 0$ | ✓ standard form |
| | $(x-4)(x+2) \ge 0$ | Sundard Torrir |
| | x = 4 or $x = -2$ | ✓ critical values |
| | $x \le -2$ or $x \ge 4$ | · critical values |
| | | $\checkmark \checkmark x \le -2 \text{ or } x \ge 4$ |
| | | (4) |
| 1.1.4 | $5^{2x} - 5^x = 0$ | |
| | $5^{x}(5^{x}-1)=0$ | ✓ common factor |
| | | $\checkmark 5^x \neq 0$ |
| | $5^x \neq 0$ or $5^x = 1$ | $\checkmark 5^x = 1$ |
| | x = 0 | $\checkmark x = 0 \tag{4}$ |
| | | |
| | OR/OF | OR/OF |
| | $5^{2x} = 5^x$ | $\checkmark 5^{2x} = 5^x$ |
| | 2x = x | $\checkmark 2x = x$ |
| | 2x - x = 0 | $\checkmark 2x - x = 0$ |
| | x = 0 | $\checkmark x = 0 \tag{4}$ |

| | · · | | |
|-------|---|---|------|
| 1.1.5 | $\frac{x}{\sqrt{20-x}} = 1$ | | |
| | $\begin{vmatrix} \sqrt{20-x} \\ x = \sqrt{20-x} \end{vmatrix}$ | ✓ isolating the surd | |
| | $\begin{vmatrix} x - \sqrt{20 - x} \\ x^2 = 20 - x \end{vmatrix}$ | ✓ squaring both sides | |
| | $\begin{vmatrix} x &= 20 - x \\ x^2 + x - 20 = 0 \end{vmatrix}$ | squaring oour sides | |
| | | ✓ standard form | |
| | $x = 4$ or $x \neq -5$ | | |
| | | ✓ answers ✓ selection | |
| | | Sciection | (5) |
| 1.2 | $2x^2 - y^2 = 7$ (1) | | (0) |
| 1.2 | $x + y = 9 \qquad \dots (1)$ $\dots (2)$ | | |
| | y = 9 - x | $\checkmark y = 9 - x$ | |
| | $2x^2 - (9 - x)^2 = 7$ | | |
| | ` ' | ✓ substitution | |
| | $2x^2 - 81 + 18x - x^2 = 7$ | (, 1 16 | |
| | $\begin{cases} x^2 + 18x - 88 = 0\\ (x + 22)(x - 4) = 0 \end{cases}$ | ✓ standard form | |
| | | | |
| | x = -22 or x = 4 y = 31 or y = 5 | ✓ x-values | |
| | y = 31 or $y = 3$ | ✓ y-values | (5) |
| | OR/OF | OR/OF | (3) |
| | $2x^2 - y^2 = 7 \qquad \dots (1)$ | | |
| | $x + y = 9 \qquad \dots (2)$ | | |
| | x = 9 - y | $\checkmark x = 9 - y$ | |
| | $2(9-y)^2 - y^2 = 7$ | ✓ substitution | |
| | $2(81-18y+y^2)-y^2-7=0$ | Substitution | |
| | | | |
| | $162 - 36y + 2y^2 - y^2 - 7 = 0$ | / 1 1 6 | |
| | $y^2 - 36y + 155 = 0$ | ✓ standard form | |
| | (y-31)(y-5)=0 | | |
| | y = 31 or $y = 5$ | ✓ y-values ✓ x-values | |
| | x = -22 or $x = 4$ | * x-values | (5) |
| 1.3 | $P \times T = (1-a)(1+a)(1+a^2)(1+a^4)(1+a^{512})$ | | (5) |
| 1.5 | $\begin{bmatrix} 1 & 1 & -(1-a)(1+a)(1+a) & (1+a) & (1+a) \\ 0 & 2 & (1-a)(2)(1+a) & (1+a)(1+a) & (1+a)(1+a) \end{bmatrix}$ | | |
| | $P \times T = (1 - a^{2})(1 + a^{2})(1 + a^{4})(1 + a^{512})$ | $\checkmark (1-a^4)$ $\checkmark (1-a^{512})$ $\checkmark 1-a^{1024}$ | |
| | $P \times T = (1 - a^4)(1 + a^4)(1 + a^{512})$ | , | |
| | $P \times T = (1 - a^8) \dots (1 + a^{512})$ | $\checkmark (1-a^{512})$ | |
| | $P \times T = (1 - a^{512})(1 + a^{512})$ | , , | |
| | $=1-a^{1024}$ | $\checkmark 1-a^{1024}$ | |
| | | | (3) |
| | | | [26] |

QUESTION 2/VRAAG 2

| 2.1.1 | $r = \frac{1}{2}$ | $\checkmark r = \frac{1}{2}$ |
|-------|---|---|
| | Yes, because $-1 < \frac{1}{2} < 1$ | ✓ answer with reason |
| | | (2) |
| 2.1.2 | $S_{\infty} = \frac{a}{1 - r}$ | |
| | $S_{\infty} = \frac{a}{1-r}$ $S_{\infty} = \frac{4}{1-\frac{1}{2}}$ | ✓ substitution |
| | $\therefore S_{\infty} = 8$ | ✓ answer |
| 2.2 | $\sum_{p=k}^{10} 3^{p-1} = 3^{k-1} + 3^{k+1-1} + 3^{k+2-1} + \dots + 3^9$ | (2) |
| | $= 3^{k-1} + 3^k + 3^{k+1} + \dots 3^9$ $S_n = \frac{a(r^n - 1)}{r - 1}$ | $\checkmark a = 3^{k-1}$ |
| | $S_n = \frac{1}{r-1}$ $29 520 = \frac{3^{k-1}(3^{11-k} - 1)}{3-1}$ | $\checkmark a = 3^{k-1}$ $\checkmark r = 3$ $\checkmark n = 11 - k$ |
| | $3^{10} - 3^{k-1} = 59040$ | $\checkmark n = 11 - k$ \checkmark substitution |
| | $3^{k-1} = 9$ $k-1=2$ | |
| | $\therefore k = 3$ | ✓ answer (5) |
| | | [9] |

QUESTION 3/VRAAG 3

| 3.1.1 | 3;7;12;18 | |
|-------|---|--|
| | V V V | |
| | First diff: 4;5;6 | |
| | Second diff: 1;1 | |
| | 2a=1 | / 2 1 |
| | 1 | ✓ 2 <i>a</i> =1 |
| | $a = \frac{1}{2}$ | |
| | 3a+b=4 | |
| | $3\left(\frac{1}{2}\right) + b = 4$ | (1) |
| | | $\checkmark 3\left(\frac{1}{2}\right) + b = 4$ |
| | $b=\frac{5}{2}$ | (2) |
| | a+b+c=3 | |
| | | . 1 5 |
| | $\frac{1}{2} + \frac{5}{2} + c = 3$ | $\checkmark \frac{1}{2} + \frac{5}{2} + c = 3$ |
| | c = 0 | (3) |
| | $T_{-} = \frac{1}{n^2} + \frac{5}{n}$ | |
| 2.1.2 | ⁿ 2 2 | |
| 3.1.2 | $T_n = \frac{1}{2}n^2 + \frac{5}{2}n$ $13527 = \frac{1}{2}n^2 + \frac{5}{2}n$ | $\checkmark 13527 = \frac{1}{2}n^2 + \frac{5}{2}n$ |
| | $n^2 + 5n - 27\ 054 = 0$ | ✓ standard form |
| | | standard form |
| | (n-162)(n+167)=0 n=162 or $n=-167$ | \checkmark answers for n |
| | $T_{161} = 13363$ | answers for n |
| | $T_{161} + 164 = 13527$ | |
| | 164 must be added. | (164 |
| | 101 must be udded. | ✓ 164 (4) |
| | OR/OF | OR/OF |
| | T = 3 L sum of 1st differences | |
| | $T_n = 3 + \text{sum of } 1^{\text{st}} \text{ differences}$ 13527 = 3 + 4 + 5 + + n | $\checkmark 13527 = 3 + 4 + 5 + + n$ |
| | | · 13321 - 3+++3++1l |
| | $\left[\frac{n-3+1}{2}[3+n]=13527\right]$ | $\sqrt{n^2 + n - 27060} = 0$ |
| | $n^2 + n - 27060 = 0$ | 2,000 |
| | (n+165)(n-167)=0 | \checkmark answers for n |
| | n = 164 | ✓ answers for <i>n</i> ✓ 164 |
| | | (4) |
| | | |

| 3.2.1 | $T_n = 8 + (n-1)(3)$ | |
|--------|-------------------------------------|---|
| | $T_n = 3n + 5$ | $\checkmark T_n = 3n + 5$ $\checkmark T_n = 41$ |
| | 41 = 3n + 5 | $\checkmark T_n = 41$ |
| | 36 = 3n | |
| | n = 12 | ✓ answer |
| 3.2.2a | D =12 | (3) ✓ answer |
| 3.2.2a | $P_{41} = 12$ | (1) |
| | | (1) |
| 3.2.2b | $P_8 = a + 7d = 1$ | $\checkmark a + 7d = 1$ |
| | $P_{11} = a + 10d = 2$ | $\checkmark a + 10d = 2$ |
| | 3d = 1 | |
| | $d=\frac{1}{3}$ | ✓ value of d |
| | 3 | , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| | $a + 7\left(\frac{1}{3}\right) = 1$ | |
| | | ✓ value of a |
| | $a = -\frac{4}{3}$ | $\begin{array}{c c} \bullet & \text{value of } a \\ \hline \end{array} \tag{4}$ |
| | 3 | [15] |

QUESTION 4/VRAAG 4

| | x = 1 | $\checkmark x = 1$ $\checkmark y = 2$ |
|-----|---|---|
| | y = 2 | $y = 2 \tag{2}$ |
| 4.2 | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ✓ x-intercept ✓ y-intercept ✓ asymptotes ✓ shape (4) |
| 4.3 | $x < \frac{1}{2}$ or $x > 1$ | $\checkmark x < \frac{1}{2}$ $\checkmark x > 1 \tag{2}$ |
| 4.4 | y = -(x-1) + 2 $y = -x + 3$ | ✓ substitution of (1;2) ✓ answer (2) |
| | OR/OF y-2=-(x-1) $y=-x+3$ | OR/OF ✓ substitution of (1;2) ✓ answer |
| | OR/OF | OR/OF |
| | $y = -x + c$ $2 = -(1) + c$ $c = 3$ $\therefore y = -x + 3$ | ✓ substitution of (1; 2) ✓ answer (2) [10] |

QUESTION5/VRAAG 5

| 5.1 | P ′ (2;4) | $\checkmark x = 2$ |
|-----|---|---|
| | | $\checkmark x = 2$ $\checkmark y = 4$ |
| | | (2) |
| 5.2 | $f(x) = \log_a x$ | |
| | $2 = \log_a 4$ | ✓ substitute (4; 2) |
| | $a^2 = 4$ | $\checkmark a^2 = 4$ |
| | a = 2 | (2) |
| 5.3 | $y = 2^x$ | $\checkmark y = 2^x$ |
| | | (1) |
| 5.4 | $1 = \log_2 x$ | |
| | $\therefore x = 2 \qquad T(2;1)$ | $\checkmark x = 2$ |
| | RT = 2 units P'T = 3 units | \checkmark RT = 2 units \checkmark P'T = 3 units |
| | Area of $\triangle RTP^{\prime} = \frac{1}{2}.RT.TP^{\prime}$ | |
| | $= \frac{1}{2} \times 2 \times 3 = 3 \text{ units}^{2}$ | ✓ answer |
| | | (4) [9] |

OUESTION 6/VRAAG 6

| 6.1 $y \ge -4$ or $y \in [-4; \infty)$ |
|--|
| $(x-3)(x+1) = 0$ $x = 3 \text{ or } x = -1$ $\therefore E(3;0) \text{ and } D(-1;0)$ (5.3) $\therefore m_{pE} = 1$ $\therefore g(x) = x - 3$ (5.4) $f(x) > g(x)$ $x < 0 \text{ or } x > 3$ (5.5) $Distance = -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0$ $\therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ (5.5) (5.6) (5.6) (5.7) (7.5) (7.5) (7.5) (8.6) (8.7) (9.7) |
| $x = 3 \text{ or } x = -1$ $\therefore E(3; 0) \text{ and } D(-1; 0)$ $0.3 P(0; -3)$ $\therefore m_{PE} = 1$ $\therefore g(x) = x - 3$ $0.4 f(x) > g(x)$ $x < 0 \text{ or } x > 3$ $0.5 Distance = -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0 \text{or/of} x = -\frac{b}{2a}$ $\therefore x = \frac{1}{2} \therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $0.5 \text{on } x = -\frac{b}{2a}$ $\therefore x = \frac{1}{2} \text{on } x = -\frac{b}{2a}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2} \text{on } x = \frac{1}{2}$ $\text{on } x = \frac{1}{2} \text{on } x = \frac{1}$ |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |
| of coordinates 6.3 $P(0; -3)$ $\therefore m_{pE} = 1$ $\therefore g(x) = x - 3$ 6.4 $f(x) > g(x)$ $x < 0$ or $x > 3$ 6.5 Distance $= -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0$ or/of $x = -\frac{b}{2a}$ $\therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ of coordinates of coordinates of coordinates of coordinates of coordinates of coordinates of $m_{pE} = 1$ $f(x) = x + 3$ $f(x) = x + 3$ $f(x) = x + 4$ |
| 6.3 $P(0; -3)$ $\therefore m_{PE} = 1$ $\therefore g(x) = x - 3$ $\forall g(x) = x - 3$ $\forall g(x) = x - 3$ (6.4 $f(x) > g(x)$ $x < 0 \text{ or } x > 3$ $\forall x > 3$ $\forall x > 3$ (7.5 $\Rightarrow x > 3$ $\Rightarrow x $ |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |
| |
| 6.5 Distance $= -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0 	 or/of 	 x = -\frac{b}{2a} 	 \checkmark x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $\checkmark x > 3$ $\checkmark x > 3$ $\checkmark D = -x^2 + x + 6$ $\checkmark method$ $\checkmark x = \frac{1}{2}$ $\checkmark substitution$ $\checkmark answer$ |
| 6.5 Distance $= -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0 	 or/of 	 x = -\frac{b}{2a} 	 \checkmark x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $\checkmark x > 3$ $\checkmark x > 3$ $\checkmark D = -x^2 + x + 6$ $\checkmark method$ $\checkmark x = \frac{1}{2}$ $\checkmark substitution$ $\checkmark answer$ |
| 6.5 Distance $= -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0 	 or/of 	 x = -\frac{b}{2a} 	 \checkmark method$ $\therefore x = \frac{1}{2} 	 \therefore x = \frac{1}{2} 	 \checkmark x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ ✓ substitution $\checkmark \text{ answer} 	 ($ |
| $D' = -2x + 1 = 0 \qquad \text{or/of} \qquad x = -\frac{b}{2a}$ $\therefore x = \frac{1}{2} \qquad \therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ (25) $= \frac{5}{4} = 6,25$ (35) $\Rightarrow \text{or/of} \qquad x = -\frac{b}{2a}$ $\Rightarrow x = \frac{1}{2}$ $\Rightarrow \text{substitution}$ $\Rightarrow \text{answer}$ |
| $\therefore x = \frac{1}{2} \qquad \therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $(x) = xx = \frac{1}{2}$ $\checkmark \text{ substitution}$ $\checkmark \text{ answer}$ |
| $\therefore x = \frac{1}{2} \qquad \therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $(x) = xx = \frac{1}{2}$ $\checkmark \text{ substitution}$ $\checkmark \text{ answer}$ |
| $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $\checkmark \text{ substitution}$ $\checkmark \text{ answer}$ |
| $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$ $\checkmark \text{ substitution}$ $\checkmark \text{ answer}$ |
| $= \frac{25}{4} = 6,25$ \checkmark answer (|
| $= \frac{25}{4} = 6,25$ \checkmark answer (|
| 66 |
| 66 |
| 6.6 |
| $1 = 2x - 2$ $x = \frac{3}{2}$ $x = \frac{3}{2}$ $x = \frac{3}{2}$ |
| $x = \frac{3}{2}$ $x = \frac{3}{2}$ $x = \frac{3}{2}$ |
| $\begin{bmatrix} 2 & & & \\ 2 & & & \\ 2 & & & \end{bmatrix}$ |
| $\begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 $ |
| Point on t: -: |
| $\sqrt{\frac{-15}{1}}$ |
| $\begin{bmatrix} 15 & 3 \\ 2 & 3 \end{bmatrix}$ |
| $\sqrt{-\frac{15}{4} - \left(\frac{3}{2} - 3\right) - n}$ |
| $\left \begin{array}{c} \mathbf{v} - \frac{1}{4} = \left(\frac{1}{2} - 3\right) - n \end{array}\right $ |
| $\therefore n = 2\frac{1}{4} = \frac{9}{4} = 2,25$ |
| 4 4 2,20 ✓ answer |
| OD/OF |
| $ \begin{array}{ c c } \mathbf{OR/OF} \\ f(x) = k(x) \end{array} $ |
| $\begin{cases} f(x) = k(x) \\ x^2 - 2x - 3 = x - 3 - n \end{cases}$ \(\sigma \text{equating} |
| |
| $x^2 - 3x + n = 0$ \checkmark standard form |
| $\Delta = b^2 - 4ac$ substitution into \(\Delta \) |
| $=(-3)^2 -4(1)(n)$ |
| To touch: $\Delta = 0$ |
| 0 = 9 - 4n |
| 4n = 9 |
| $n = \frac{9}{2}$ answer |
| $n-\frac{1}{4}$ |
| [1 |

QUESTION 7/VRAAG 7

| 7.1 | $A = P(1-i)^n$ | |
|-----|--|-----------------------------|
| | $8337,75 = 13000(1-i)^6$ | ✓ substitution in correct |
| | i = 7.14% | formula ✓✓ answer |
| | 1,32 170 | (3) |
| 7.2 | $x[(1+i)^n-1]$ | |
| | $F = \frac{x[(1+i)^n - 1]}{i}$ | |
| | $\begin{bmatrix} (86)^{36} \end{bmatrix}$ | \bigvee_i |
| | $80000 = \frac{x \left[\left(1 + \frac{8,6}{1200} \right)^{36} - 1 \right]}{8,6}$ | · · |
| | 80000= [1200)] | ✓ substitution into correct |
| | $\frac{8,0}{1200}$ | formula |
| | 1200 n = D1 055 79 | ✓answer |
| | x = R1 955,78 | ✓ answer |
| | Thandi's total = $1955,78 \times 36 = R70408,08$ | |
| | Eric's total = $1402,31 \times 48 = R$ 67 310,88 | |
| | Difference = 70 409,08 – 67 310,88 | ✓ answer |
| | = R3 097,20 | v answer (4) |
| 7.3 | $A = P(1+i)^n$ | () |
| | $A = P(1+i)^n$ $A = 225000 \left(1 + \frac{0.09}{12}\right)^3$ | |
| | $A = 225000 \left(1 + \frac{0.09}{12} \right)$ | ✓ substitution in correct |
| | A = R 230100,5637 | formula ✓ answer |
| | 11 11 250100,5057 | |
| | $\begin{bmatrix} (0.09)^{-n} \end{bmatrix}$ | |
| | $225000 \left(1 + \frac{0,09}{12}\right)^{3} = \frac{5500 \left[1 - \left(1 + \frac{0,09}{12}\right)^{-n}\right]}{0,09}$ | |
| | $\left 225000 \left(1 + \frac{0.05}{12} \right) \right = \frac{1}{0.09}$ | |
| | $\frac{6,65}{12}$ | |
| | $(0.09)^{-n}$ | (1 - 4 i 4 - 4 i |
| | $0,3137734959 = 1 - \left(1 + \frac{0,09}{12}\right)^{-n}$ | ✓ substitution |
| | · · · · · · · · · · · · · · · · · · · | |
| | $\left(1 + \frac{0.09}{12}\right)^{-n} = 0.6862265041$ | |
| | | |
| | $-n = \log_{(0.09)} 0.6862265041$ | ✓ simplification |
| | $-n = \log_{\left(1 + \frac{0.09}{12}\right)} 0,6862265041$ | Simpinication |
| | n = 50,394375 | |
| | n = 51 | ✓ use of logs |
| | | |
| | | ✓ answer |
| | | (6) |
| | | [13] |

QUESTION8/VRAAG 8

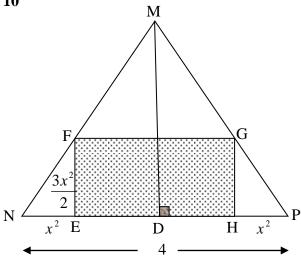
| 8.1 | $f(x) = \frac{1}{x}$ | |
|-----|--|--|
| | $f(x) = \frac{1}{x}$ $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ | |
| | $\frac{1}{(n+k)} - \frac{1}{n}$ | $\checkmark f(x+h) = \frac{1}{1}$ |
| | $f'(x) = \lim_{h \to 0} \frac{\frac{1}{(x+h)} - \frac{1}{x}}{h}$ | $\checkmark f(x+h) = \frac{1}{x+h}$ |
| | $f'(x) = \lim_{h \to 0} \frac{x - (x+h)}{x(x+h)} \times \frac{1}{h}$ | $\checkmark \frac{x - (x + h)}{x(x + h)} \times \frac{1}{h}$ |
| | $f'(x) = \lim_{h \to 0} \frac{-h}{x(x+h)} \times \frac{1}{h}$ | $\checkmark \frac{-h}{x(x+h)} \times \frac{1}{h}$ |
| | $f'(x) = \lim_{h \to 0} \frac{-1}{x(x+h)}$ | |
| | $f'(x) = -\frac{1}{x^2}$ | $\checkmark \frac{-1}{x(x+h)}$ |
| | x^2 | ✓answer (5) |
| | OR/OF | OR/OF |
| | $f(x) = \frac{1}{x}$ | |
| | $f(x) = \frac{1}{x}$ $f(x+h) = \frac{1}{x+h}$ $f(x+h) - f(x) = -\frac{h}{x(x+h)}$ $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ | $\checkmark f(x+h) = \frac{1}{x+h}$ |
| | $f(x+h)-f(x) = -\frac{h}{x(x+h)}$ | $\checkmark f(x+h) = \frac{1}{x+h}$ $\checkmark f(x+h) - f(x) = -\frac{h}{x(x+h)}$ |
| | $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ | |
| | $f'(x) = \lim_{h \to 0} \frac{-h}{x(x+h)} \times \frac{1}{h}$ | $\checkmark \frac{-h}{x(x+h)} \times \frac{1}{h}$ |
| | $f'(x) = \lim_{h \to 0} \frac{-1}{x(x+h)}$ $f'(x) = -\frac{1}{x^2}$ | $\checkmark \frac{-1}{x(x+h)}$ |
| | $f'(x) = -\frac{1}{x^2}$ | ✓answer |
| | | (5) |
| | | |

| 8.2.1 | $\frac{d}{dx}\left(\sqrt{4x^6} + \sqrt{2}.x^2\right)$ $= \frac{d}{dx}\left(2x^3 + \sqrt{2}.x^2\right)$ $= 6x^2 + 2\sqrt{2}x$ | $\checkmark 2x^{3}$ $\checkmark 6x^{2}$ $\checkmark 2\sqrt{2}x$ (3) |
|-------|--|---|
| 8.2.2 | $g(x) = \frac{3x^4 - 4x^2 + 6}{x^2}$ $g(x) = 3x^2 - 4 + 6x^{-2}$ $g'(x) = 6x - 12x^{-3}$ | $ √3x^{2} - 4 + 6x^{-2} $ $ √6x $ $ √-12x^{-3} $ (3) |
| 8.3 | $f(x) = 3x^{2} + bx + c$ $f'(x) = 6x + b$ $f'(1) = 6 + b = 9$ $\therefore b = 3$ $f(1) = 3 + 3 + c = 0$ $c = -6$ $\therefore f(x) = 3x^{2} + 3x - 6$ | √ f / (1) = 6 + b = 9 $ √ b = 3 $ $ √ f(1) = 3 + 3 + c = 0 $ $ √ c = -6 $ (4) |
| | | [15] |

QUESTION9/VRAAG9

| 9.1 | $f(x) = ax^3 + bx^2 + cx - 5$ | |
|-----|---|---|
| | $-5 = a(0+1)^2(0-5)$ | |
| | -5 = -5a | ✓ substitution of <i>x</i> -intercepts ✓ simplification |
| | a=1 | Simplification |
| | f(x) = (x+1)(x+1)(x-5) | |
| | $f(x) = (x^2 + 2x + 1)(x - 5)$ | |
| | $f(x) = x^3 - 3x^2 - 9x - 5$ | ✓ simplification |
| | $\therefore b = -3 \text{ and } c = -9$ | (3) |
| | | |
| 9.2 | $f(x) = x^3 - 3x^2 - 9x - 5$ | |
| | $f'(x) = 3x^2 - 6x - 9$ | $\checkmark f'(x) = 3x^2 - 6x - 9$ |
| | $x^2 - 2x - 3 = 0$ | $\checkmark f'(x) = 0$ |
| | (x-3)(x+1) = 0 | √factors |
| | x = 3 or $x = -1$ | $\checkmark x=3$ |
| | Minimum value at $x = 3$ | $\begin{array}{c c} \mathbf{v} & x = 3 \end{array} \tag{4}$ |
| | | (4) |
| 9.3 | f''(x).f(x) > 0 | ✓ x = 1 |
| | Point of inflection: $x = 1$ | $\checkmark x < 1 ; x \neq -1$ |
| | $x < 1$; $x \ne -1$ or $x > 5$ | $\checkmark x > 5 \tag{3}$ |
| 9.4 | -32 < -t < -5 | √-32 |
| 7 | 5 < t < 32 | $\sqrt{-32} < -t < -5$ |
| | | $\checkmark 5 < t < 32 \tag{3}$ |
| | OR/OF | OR/OF |
| | Shift up more than 5 units and less than 32 units | ✓ more than 5 units |
| | $\therefore 5 < t < 32$ | ✓ less than 32 units \checkmark 5 < t < 32 (3) |
| | | $\checkmark 5 < t < 32$ (3) [13] |
| | | |

QUESTION 10/VRAAG 10



| 10.1 | $\frac{NE}{EF} = \frac{2}{3} = \frac{x^2}{b}$ | $\checkmark \frac{NE}{NE} = \frac{2}{NE} = \frac{x^2}{NE}$ | |
|------|--|--|------------|
| | | EF 3 b | |
| | $3x^2 = 2b$ | $\checkmark : b = \frac{3x^2}{2}$ | |
| | $\therefore b = \frac{3x^2}{2}$ | 2 | |
| | $EH = 4 - 2x^2$ | $\checkmark EH = 4 - 2x^2$ | |
| | Area EFGH = $(4-2x^2)\left(\frac{3x^2}{2}\right)$ | $\checkmark \frac{NE}{EF} = \frac{2}{3} = \frac{x^2}{b}$ $\checkmark \therefore b = \frac{3x^2}{2}$ $\checkmark EH = 4 - 2x^2$ $\checkmark (4 - 2x^2) \left(\frac{3x^2}{2}\right)$ | |
| | $A(x) = 6x^2 - 3x^4$ | (2) | (4) |
| | OR/OF | OR/OF | (4) |
| | In $\triangle DMP$: $\tan P = \frac{3}{2}$ | | |
| | In \triangle HGP: $\tan P = \frac{GH}{x^2}$ | | |
| | $\frac{GH}{x^2} = \frac{3}{2}$ | $\checkmark \frac{\text{GH}}{x^2} = \frac{2}{3}$ | |
| | $\therefore b = \frac{3x^2}{2}$ | $\checkmark \therefore b = \frac{3x^2}{2}$ | |
| | $EH = 4 - 2x^2$ | $\checkmark \text{ FH} - 4 - 2x^2$ | |
| | Area EFGH = $(4-2x^2)\left(\frac{3x^2}{2}\right)$ | $\checkmark \frac{GH}{x^2} = \frac{2}{3}$ $\checkmark : b = \frac{3x^2}{2}$ $\checkmark EH = 4 - 2x^2$ $\checkmark (4 - 2x^2) \left(\frac{3x^2}{2}\right)$ | |
| | $A(x) = 6x^2 - 3x^4$ | (2) | (4) |
| 10.2 | $A(x) = 6x^2 - 3x^4$ | | . , |
| | $A'(x) = 12x - 12x^3 = 0$ | $\checkmark 12x - 12x^3 = 0$ | |
| | $12x(1-x^2) = 0$ | \checkmark values of x | |
| | $\therefore x \neq 0 \text{ or } x = -1 \text{ or } x = 1$ | ✓ correct substitution | |
| | \therefore max area: $A(1) = 6(1)^2 - 3(1)^4 = 3 \text{ cm}^2$ | ✓ answer | |
| | | | (4) [8] |
| | | | լսյ |

QUESTION 11/VRAAG 11

| 11.1 | P(A) + P(B) = 0.52 0.4 + P(B) = 0.52 P(B) = 0.12 | ✓ substitution ✓ answer | (2) |
|--------|--|---|-----|
| 11.2.1 | $P(\text{sandwich}) = \frac{4}{25}$ | ✓ answer | (1) |
| | OR/OF $0,02 + 0,01 + 0,04 + 0,09 = \frac{4}{25} = 0,16$ | OR/OF ✓ answer | |
| | | | (1) |
| 11.2.2 | P(at least two events) = $0.02 + 0.01 + 0.03 + 0.04$ = 0.1 | ✓ 0,02 + 0,01 + 0,03 + 0,04 ✓ answer | (2) |
| 11.2.3 | P(not any) = $1 - (0.1 + 0.04 + 0.09 + 0.2)$ = 0.57 | \checkmark 1 - (0,1 + 0,04 + 0,09 + 0,2) \checkmark answer | (2) |
| 11.3.1 | 7! = 5040 | √ 7! | (1) |
| 11.3.2 | P(4 players alphabetically) = $\frac{1}{7 \times 6 \times 5 \times 4} = \frac{1}{840}$ | ✓ 1 ✓ 840 ✓ 1/840 | (3) |

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| F F F F F F F F F F | 11.3.3 | | | | | | | | | | | |
|---|--------|---------------------------------|--------------|-----------|---|---|--|---|--|----------------|------|--|
| F arrangements: 4! M arrangements: 5 options with 3 males = 5 × 4 × 3 4! × 5 × 4 × 3 = 1 440 OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF (3) OR/OF OR/OF | | F | | F | | F | | F | | | | |
| M arrangements: 5 options with 3 males = 5 × 4 × 3 4! × 5 × 4 × 3 = 1 440 OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF OR/OF (3) OR/OF | | F arrangements: 4! | | | | | | | | | | |
| 4! × 5 × 4 × 3 = 1 440 OR/OF OR/OF 10 Options: F M F M F M F M M F M F M F M F M F M F | | | | | | | | | | | | |
| = 1 440 OR/OF OR/OF 10 Options: F M F M F M F F F F M F M F M F M F M F | | | | | | | | | | | | |
| OR/OF | | $4! \times 5 \times 4 \times 3$ | | | | | | | | | | |
| OR/OF 10 Options: F M F M F M F M F M F M F M F M F M F M | | = 1 440 | | | | | | | | √ 1 440 | | |
| 10 Options: F M F M F M F M F M F M F F F F M F M F | | | | | | | | | | | (3) | |
| 10 Options: F M F M F M F M F M F M F F F F M F M F | | OD/OE | | | | | | | | OD/OF | | |
| F M F M F M F M F M F M F F F F M F M F | | UK/UF | | | | | | | | OR/OF | | |
| F M F M F M F M F M F M F F F F M F M F | | 10 Options | : : | | | | | | | | | |
| F F M F M F M F M F M F F M M F M F F M F M F M F | | | | F | | | | | | | | |
| F M F M F F M M F M F F M F M F M F F M F M F M F F M F M M F F M F F M M M F F M | | MFMF | M F | F | | | | | | | | |
| M F M F F M F M F M F F M F M F F M F M M F F M F F M M F F M F M | | F F M F | M F I | M | | | | | | | | |
| M F M F F M F M F M F M F M F M F M F M | | | | | | | | | | | | |
| F M F F M F M M F F M F F M M F F M F M | | | | | | | | | | | | |
| M F F M F F M M F M F M F M F M F M F M | | | | | | | | | | | | |
| M F F M F M F M F M F M F M F M F M F M | | | | | | | | | | | | |
| M F F F M F M Hence $10 \times 4! \times 3! = 1440$ $\checkmark 4! \times 3!$ $\checkmark \times 10$ $\checkmark 1440$ (3) | | | | | | | | | | | | |
| Hence $10 \times 4! \times 3! = 1440$ | | | | | | | | | | | | |
| Hence $10 \times 4! \times 3! = 1440$ $\checkmark \times 10$ $\checkmark 1440$ (3) | | MFFF | M F I | VI | | | | | | (41 21 | | |
| ✓1 440 (3) | | 10 | 44 24 | 1 4 4 0 | | | | | | | | |
| (3) | | Hence 10× | < 4! × 3! | = 1440 |) | | | | | | | |
| | | | | | | | | | | V 1 440 | (2) | |
| | | | | | | | | | | | . , | |
| | | | | | | | | | | | [17] | |
| TOTAL/TOTAAL: 150 | | TOTAL/TOTA | | | | | | | | OTAAL: 150 | | |