



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE SENIOR
SERTIFIKAAT**

GRADE 12/GRAAD 12

MATHEMATICS P1/WISKUNDE VI

NOVEMBER 2025

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 150

These marking guidelines consist of 21 pages.
Hierdie nasienriglyne bestaan uit 21 bladsye.

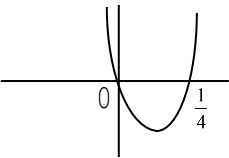
NOTE:

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

LET WEL:

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

QUESTION 1/VRAAG 1

| | | |
|-------|--|---|
| 1.1.1 | $(x+5)(x-2)=0$ $x=-5$ or $x=2$ | ✓ $x=-5$ ✓ $x=2$ (2) |
| 1.1.2 | $5x^2+2=-9x$ $5x^2+9x+2=0$ $x=\frac{-9\pm\sqrt{(9^2)-4(5)(2)}}{2(5)}$ $x=\frac{-9\pm\sqrt{41}}{10}$ $x=-0,26$ or $x=-1,54$ | ✓ standard form ✓ substitution into the correct formula ✓ answer ✓ answer (4) |
| 1.1.3 | $8x^2>2x$ $8x^2-2x>0$ $2x(4x-1)>0$ CV: 0 ; $\frac{1}{4}$  $x<0$ or $x>\frac{1}{4}$ | ✓ standard form ✓ critical values/factors ✓✓ answer (4) |
| 1.1.4 | $2\cdot 2^{2x}-9\cdot 2^x+4=0$ $(2\cdot 2^x-1)(2^x-4)=0$ $2^x=\frac{1}{2}$ or $2^x=4$ $2^x=2^{-1}$ $2^x=2^2$ $x=-1$ $x=2$ | ✓ factors ✓ both equations ✓ answer ✓ answer (4) |

| | | |
|-------|---|--|
| | <p>OR/OF</p> $2 \cdot 2^{2x} - 9 \cdot 2^x + 4 = 0$ <p>Let $k = 2^x$</p> $2k^2 - 9k + 4 = 0$ $(2k - 1)(k - 4) = 0$ $k = \frac{1}{2} \text{ or } k = 4$ $\therefore 2^x = \frac{1}{2} \text{ or } 2^x = 4$ $\therefore x = -1 \text{ or } x = 2$ | <p>OR/OF</p> <p>✓ factors</p> <p>✓ both equations</p> <p>✓ answer</p> <p>✓ answer</p> <p>(4)</p> |
| 1.1.5 | $\sqrt{\sqrt{\frac{1}{x}} + 2} = \frac{1}{\sqrt{x}}$ $\left(\sqrt{\sqrt{\frac{1}{x}} + 2} \right)^2 = \left(\frac{1}{\sqrt{x}} \right)^2$ $\sqrt{\frac{1}{x}} + 2 = \frac{1}{x}$ $\frac{1}{\sqrt{x}} = \frac{1}{x} - 2$ $\left(\frac{1}{\sqrt{x}} \right)^2 = \left(\frac{1}{x} - 2 \right)^2$ $\frac{1}{x} = \frac{1}{x^2} - \frac{4}{x} + 4$ $\frac{1}{x^2} - \frac{5}{x} + 4 = 0$ $4x^2 - 5x + 1 = 0$ $(4x - 1)(x - 1) = 0$ $x = \frac{1}{4} \text{ or } x \neq 1$ <p>OR/OF</p> | <p>✓ squaring both sides</p> <p>✓ isolation of surd</p> <p>✓ squaring both sides only after isolation of surd</p> <p>✓ standard form</p> <p>✓ answer with selection</p> <p>(5)</p> <p>OR/OF</p> |

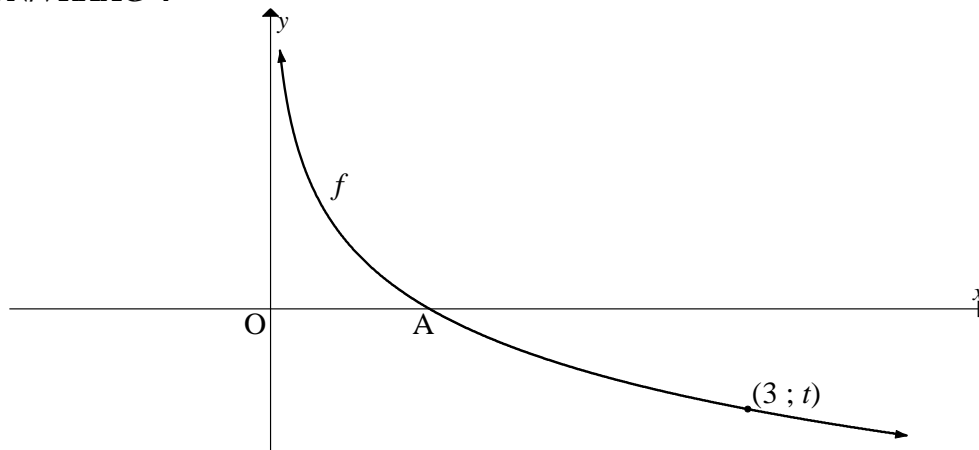
| | | |
|-------|---|---|
| 1.1.5 | $\sqrt{\sqrt{\frac{1}{x}} + 2} = \frac{1}{\sqrt{x}}$ Let $\frac{1}{\sqrt{x}} = k$ $\sqrt{k+2} = k$ $k+2 = k^2$ $k^2 - k - 2 = 0$ $(k-2)(k+1) = 0$ $\therefore k = 2 \quad \text{or} \quad k = -1$ $\frac{1}{\sqrt{x}} = 2 \qquad \text{or} \qquad \frac{1}{\sqrt{x}} \neq -1$ $2\sqrt{x} = 1$ $4x = 1$ $\therefore x = \frac{1}{4}$ | ✓ equation ✓ squaring both sides ✓ standard form ✓ substitution ✓ answer with selection (5) |
| 1.2 | $x = y + 2 \quad \dots\dots(1)$ $5xy = x^2 + 6 \quad \dots\dots(2)$ $5(y+2)y = (y+2)^2 + 6$ $5y^2 + 10y = y^2 + 4y + 4 + 6$ $4y^2 + 6y - 10 = 0$ $2y^2 + 3y - 5 = 0$ $(2y+5)(y-1) = 0$ $y = -\frac{5}{2} \quad \text{or} \quad y = 1$ $x = -\frac{1}{2} \quad \text{or} \quad x = 3$ OR/OF $y = x - 2 \quad \dots\dots(1)$ $5xy - 6 = x^2 \quad \dots\dots(2)$ $5x(x-2) - 6 = x^2$ $5x^2 - 10x - 6 = x^2$ $4x^2 - 10x - 6 = 0$ $2x^2 - 5x - 3 = 0$ $(2x+1)(x-3) = 0$ $x = -\frac{1}{2} \quad \text{or} \quad x = 3$ $y = -\frac{5}{2} \quad \text{or} \quad y = 1$ | ✓ $x = y + 2$ ✓ $5xy = x^2 + 6$ ✓ substitution ✓ standard form ✓ y-values ✓ x-values (6) OR/OF ✓ $y = x - 2$ ✓ $5xy - 6 = x^2$ ✓ substitution ✓ standard form ✓ x-values ✓ y-values (6) [25] |

QUESTION/VRAAG 2

| | | |
|-------|---|--|
| 2.1.1 | $(10+t) + (t-2) + (t+4)$ $\frac{t-2}{t+10} = \frac{t+4}{t-2}$ $(t-2)^2 = (t+4)(t+10)$ $t^2 - 4t + 4 = t^2 + 14t + 40$ $-18t = 36$ $\therefore t = -2$ | ✓ equating the ratios ✓ cross multiplication ✓ expansion (3) |
| 2.1.2 | $8; -4; \dots$ $r = \frac{-4}{8} = -\frac{1}{2}$ $T_{25} = 8\left(-\frac{1}{2}\right)^{24}$ $T_{25} = \left(\frac{1}{2}\right)^{21} \text{ or } T_{25} = (2)^{-21} \text{ or } T_{25} = (8)^{-7} \text{ or }$ $T_{25} = (128)^{-3} \text{ or } T_{25} = (2\,097\,152)^{-1}$ | ✓ 8 and -4 ✓ r ✓ answer in exponential form (3) |
| 2.1.3 | $S_{\infty} = \frac{a}{1-r}$ $S_{\infty} = \frac{8}{1-\left(-\frac{1}{2}\right)}$ $S_{\infty} = \frac{16}{3} = 5,33$ | ✓ substitution ✓ answer (2) |
| 2.2.1 | $T_{14} - T_6$ $= 4 \times 8$ $= 32$ <p>OR/OF</p> $T_{14} - T_6$ $= (4(14) - 1) - (4(6) - 1)$ $= 55 - 23$ $= 32$ <p>OR/OF</p> $T_{14} - T_6$ $= (4(k+13) - 1) - (4(k+5) - 1)$ $= 4k + 51 - (4k + 19)$ $= 32$ | ✓✓ answer (2) <p>OR/OF</p> ✓ subs ✓ answer (2) <p>OR/OF</p> ✓ subs ✓ answer (2) |

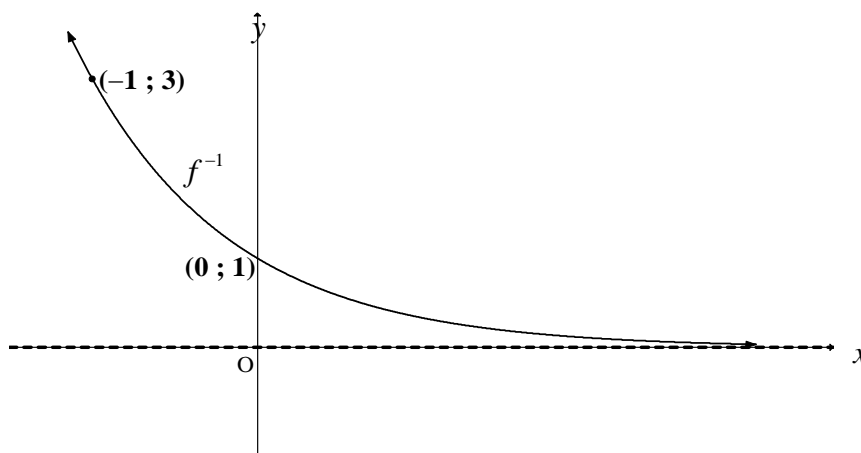
QUESTION/VRAAG 3

| | | |
|-----|---|--|
| 3.1 | $ \begin{array}{ccccccc} 36 & ; & 71 & ; & 104 & ; & 135 & ; & 164 \\ & \swarrow & \searrow & & \swarrow & \searrow & & \swarrow & \searrow \\ & 35 & & 33 & & 31 & & 29 & \\ & & \swarrow & \searrow & & \swarrow & \searrow & & \\ & & & -2 & & & & & \end{array} $ $T_5 = 164$ | ✓ first differences ✓ answer (2) |
| 3.2 | $2a = -2$ $a = -1$ $3(-1) + b = 35$ $b = 38$ $-1 + 38 + c = 36$ $c = -1$ $T_n = -n^2 + 38n - 1$ | ✓ $2a = -2$ ✓ $3(-1) + b = 35$ ✓ $-1 + 38 + c = 36$ (3) |
| 3.3 | $n = \frac{-38}{2(-1)} = 19$ $T_{19} = -(19)^2 + 38(19) - 1 = 360$ OR/OF $T'_n = -2n + 38 = 0$ $\therefore n = 19$ $T_{19} = -(19)^2 + 38(19) - 1 = 360$ | ✓ method ✓ n ✓ answer (3) OR/OF ✓ method ✓ n ✓ answer (3) |
| 3.4 | $\frac{n+3}{2} = 19$ $n+3 = 38$ $n = 35$ OR/OF $-n^2 + 38n - 1 = 104$ $n^2 - 38n + 105 = 0$ $(n-35)(n-3) = 0$ $n = 35$ | ✓ method ✓ answer (2) ✓ method ✓ answer (2) |
| | | [10] |

QUESTION/VRAAG 4

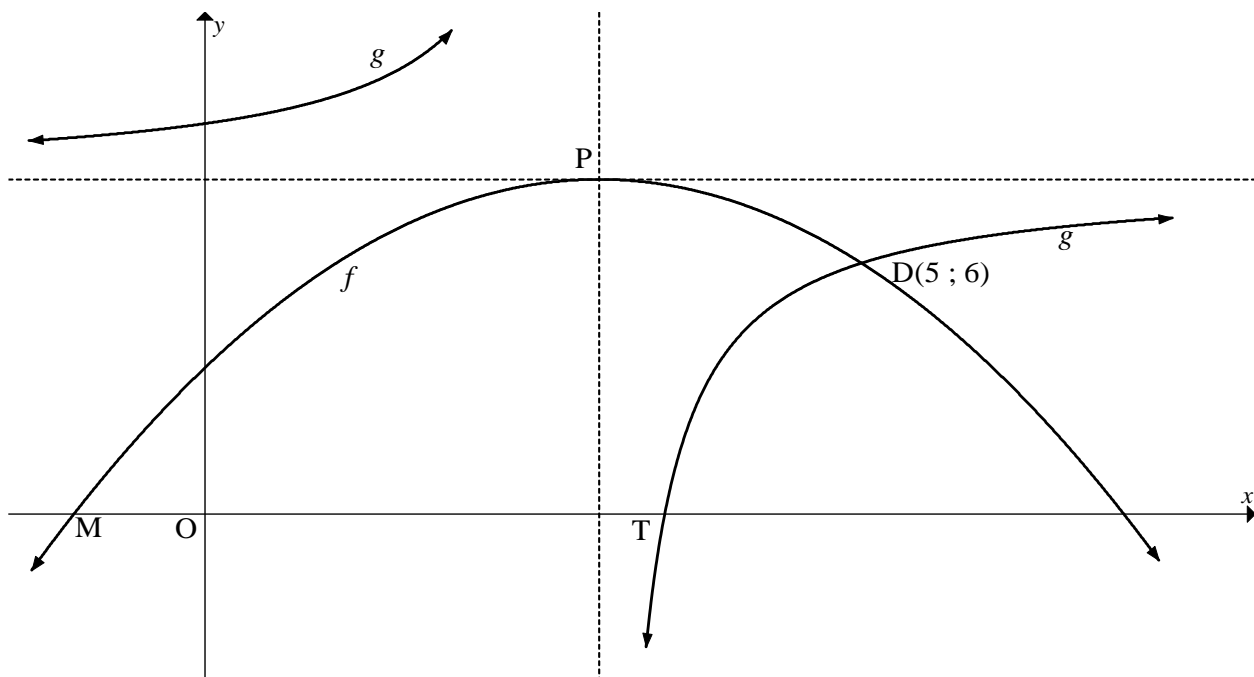
| | | |
|-----|--|--------------------------------|
| 4.1 | $t = \log_{\frac{1}{3}} 3$ $t = -1$ | ✓ answer (1) |
| 4.2 | A(1; 0) | ✓ answer (1) |
| 4.3 | $f(x) = \log_{\frac{1}{3}} x$ $y = \log_{\frac{1}{3}} x$ $x = \log_{\frac{1}{3}} y$ $y = \left(\frac{1}{3}\right)^x = 3^{-x}$ | ✓ swopping ✓ answer (2) |
| 4.4 | $y = 0$ | ✓ answer (1) |

4.5



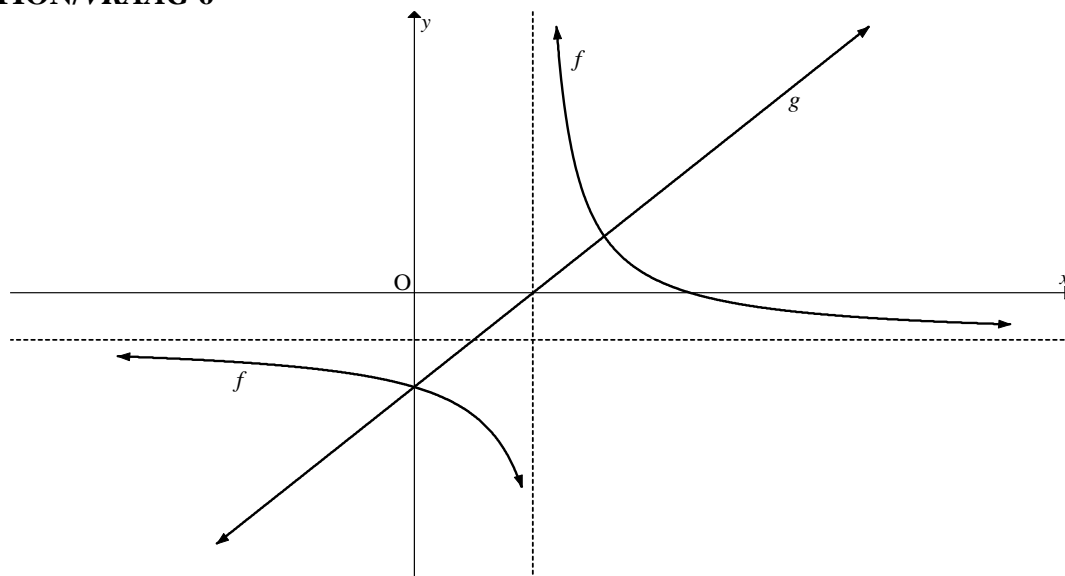
- ✓ decreasing exponential shape with asymptote $y = 0$
- ✓ y-intercept (0; 1)
- ✓ any point

| | | |
|-----|---|---------------|
| 4.6 | (4; 3) is a point on h $0 < y < 3$ or $y \in (0; 3)$ | ✓✓ answer (2) |
| | | [10] |

QUESTION/VRAAG 5

| | | |
|-------|---|---|
| 5.1 | $x \in R, x \neq 3$ | ✓ answer (1) |
| 5.2 | $y \leq 8$ | ✓ answer (1) |
| 5.3.1 | $3 < x \leq 5$ OR/OF $x \in (3; 5]$ | ✓✓ answer (2) |
| 5.3.2 | $x < 1$ or $x > 5$ OR/OF $x \in (-\infty; 1)$ or $x \in (5; \infty)$ | ✓ $x < 1$ ✓ $x > 5$ (2) |
| 5.4 | $y = a(x-3)^2 + 8$ $6 = a(5-3)^2 + 8$ $-2 = 4a$ $\therefore a = -\frac{1}{2}$ $y = -\frac{1}{2}(x-3)^2 + 8$ $y = -\frac{1}{2}(x^2 - 6x + 9) + 8$ $y = -\frac{1}{2}x^2 + 3x + \frac{7}{2}$ | ✓ p and q values ✓ substitution (5 ; 6) ✓ simplification (3) |

| | | |
|-----|---|---|
| 5.5 | $y = -\frac{1}{2}x^2 + 3x + \frac{7}{2}$ $x^2 - 6x - 7 = 0$ $(x-7)(x+1) = 0$ $x = 7 \quad \text{or} \quad x = -1$ $M(-1; 0)$ $0 = \frac{-4}{x-3} + 8$ $-8x + 24 = -4$ $x = \frac{7}{2}$ $T\left(\frac{7}{2}; 0\right)$ $MT = \frac{7}{2} + 1 = \frac{9}{2} = 4,5$ | <p>✓ solve for x</p> <p>✓ x-values</p> <p>✓ coordinates of M</p> <p>✓ solve for x</p> <p>✓ x-value</p> <p>✓ MT</p> <p>(6)</p> |
| 5.6 | $f(x) = -\frac{1}{2}x^2 + 3x + \frac{7}{2}$ $f'(x) = -x + 3$ $m = f'(5)$ $= -5 + 3$ $= -2$ $6 = -2(5) + c$ $c = 16$ $\therefore y = -2x + 16$ | <p>✓ $f'(x) = -x + 3$</p> <p>✓ $m = f'(5)$</p> <p>✓ answer</p> <p>(3)</p> |
| | | [18] |

QUESTION/VRAAG 6

| | | |
|-----|-----------|-----------------|
| 6.1 | $(-p; 0)$ | ✓ $(-p; 0)$ (1) |
|-----|-----------|-----------------|

| | | |
|-----|---|---|
| 6.2 | $g(x) = x + c$ $q = 1 + c$ $f(x) = \frac{a}{x+c} + 1 + c$ | ✓ $q = 1 + c$ ✓ $f(x) = \frac{a}{x+c} + 1 + c$ |
|-----|---|---|

Point $(0; c)$

$$c = \frac{a}{0+c} + 1 + c$$

$$-1 = \frac{a}{c}$$

$$a = -c$$

Point $(3; 3 + c)$

$$3 + c = \frac{a}{3+c} + 1 + c$$

$$✓ 3 + c = \frac{a}{3+c} + 1 + c$$

$$3 + c = \frac{-c}{3+c} + 1 + c$$

$$9 + 6c + c^2 = -c + 3 + 4c + c^2$$

$$3c = -6$$

$$c = -2$$

$$a = 2$$

$$q = -1$$

$$✓ a = 2$$

$$✓ q = -1$$

$$f(x) = \frac{2}{x-2} - 1$$

(5)

OR/OF**OR/OF**

QUESTION/VRAAG 7

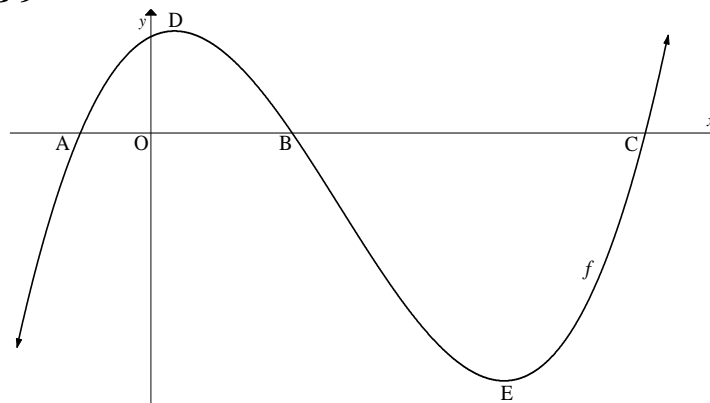
| | | |
|-------|--|--|
| 7.1 | $A = P(1+i)^n$ $A = 40\,000(1+7,8\%)^5$ $A = R\,58\,230,94$ | ✓ substitution into correct formula ✓ answer (2) |
| 7.2 | $F = \frac{x[(1+i)^n - 1]}{i}$ $F = \frac{2\,300 \left[\left(1 + \frac{0,058}{4} \right)^{24} - 1 \right]}{\frac{0,058}{4}} \times \left(1 + \frac{0,058}{4} \right)$ $F = R\,66\,411,60$ OR/OF $F = \frac{2\,300 \left[\left(1 + \frac{0,058}{4} \right)^{25} - 1 \right]}{\frac{0,058}{4}} - 2300$ $F = R\,66\,411,60$ | ✓ i ✓ substitution into correct formula ✓ future value $\times (1+i)^1$ ✓ answer (4) OR/OF ✓ i ✓ substitution into correct formula ✓ -2300 ✓ answer (4) |
| 7.3.1 | $A = P(1+i)^n$ $A = 900\,000 \left(1 + \frac{0,068}{12} \right)^3$ $= R\,915\,386,86$ $P = \frac{x[1 - (1+i)^{-n}]}{i}$ $915\,386,86 = \frac{10\,000 \left[1 - \left(1 + \frac{0,068}{12} \right)^{-n} \right]}{\frac{0,068}{12}}$ $\left(1 + \frac{0,068}{12} \right)^{-n} = 0,4812...$ $-n = \log_{1,005...} 0,4812...$ $n = 129,419... \text{ months}$ $\therefore 132,419 \text{ months since loan was granted}$ $\therefore 133 \text{ months since loan was granted}$ | ✓ answer ✓ substitution into correct formula ✓ correct use of logs ✓ answer of n ✓ final answer (5) |

| | | |
|-------|--|---|
| 7.3.2 | $P = \frac{10\,000 \left[1 - \left(1 + \frac{0,068}{12} \right)^{-0,419...} \right]}{\frac{0,068}{12}}$ $= R4\,173,55...$ $\text{Final payment} = 4\,173,55... \left(1 + \frac{0,068}{12} \right)^1 = R4\,197,21$ <p>OR/OF</p> $A = 915\,386,86 \left(1 + \frac{0,068}{12} \right)^{129}$ $= R1\,897\,482,712$ $F = \frac{10\,000 \left[\left(1 + \frac{0,068}{12} \right)^{129} - 1 \right]}{\frac{0,068}{12}}$ $= R1\,893\,309,16$ $\text{Balance after 129 months} = R4\,173,552$ $\text{Final payment} = 4\,173,552 \left(1 + \frac{0,068}{12} \right)^1 = R4\,197,21$ | ✓ substitution ✓ n ✓ balance ✓ final payment (4) OR/OF ✓ answer ✓ answer ✓ balance ✓ final payment (4) |
| | | [15] |

QUESTION/VRAAG 8

| | | |
|-------|---|--|
| 8.1 | $f(x) = -2x + 3$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2(x+h) + 3 - (-2x + 3)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2h}{h}$ $= \lim_{h \rightarrow 0} (-2)$ $= -2$ OR/OF $f(x) = -2x + 3$ $f(x+h) = -2(x+h) + 3$ $f(x+h) - f(x) = -2x - 2h + 3 + 2x - 3 = -2h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2h}{h}$ $= \lim_{h \rightarrow 0} (-2)$ $= -2$ | ✓ $f(x+h)$ ✓ substitution ✓ simplification ✓ answer (4) OR/OF ✓ $f(x+h)$ ✓ simplification ✓ substitution ✓ answer (4) |
| 8.2.1 | $g(x) = -3x^4 + 2x$ $g'(x) = -12x^3 + 2$ | ✓ $-12x^3$ ✓ 2 (2) |
| 8.2.2 | $y = \frac{2x^4 + 1}{x^2}$ $y = 2x^2 + x^{-2}$ $\frac{dy}{dx} = 4x - 2x^{-3}$ | ✓ $2x^2$ ✓ x^{-2} ✓ derivative first term ✓ derivative second term (4) |
| | | [10] |

QUESTION/VRAAG 9



| | | |
|-----|--|--|
| 9.1 | $f(x) = x^3 - 8x^2 + 5x + 14$ $f'(x) = 3x^2 - 16x + 5 = 0$ $(3x - 1)(x - 5) = 0$ $x = \frac{1}{3}$ or $x = 5$ $E(5; -36)$ | $\checkmark f'(x)$ $\checkmark f'(x) = 0$ $\checkmark x\text{-value}$ $\checkmark y\text{-value}$ (4) |
| 9.2 | $f''(x) = 6x - 16 < 0$ $x < \frac{8}{3}$ OR/OF $x = \frac{\frac{1}{3} + 5}{2} = \frac{8}{3}$ $x < \frac{8}{3}$ | $\checkmark f''(x)$ $\checkmark f''(x) < 0$ $\checkmark \text{answer}$ (3) OR/OF $\checkmark \text{midpoint of TPs}$ $\checkmark f''(x) < 0$ $\checkmark \text{answer}$ (3) |
| 9.3 | $x\text{-intercepts of } f: (-1; 0) \text{ and } (7; 0)$ $-1 < x < 2$ or $\frac{8}{3} < x < 7$ | $\checkmark\checkmark x\text{-intercepts}$ $\checkmark \text{first interval}$ $\checkmark \text{second interval}$ (4) |
| 9.4 | $3x^2 - 16x + 5 = -11$ $3x^2 - 16x + 16 = 0$ $(x - 4)(3x - 4) = 0$ $x = 4$ or $x = \frac{4}{3}$ At $x = 4$: $(4)^3 - 8(4)^2 + 5(4) + 14 = -11(4) + t$ $t = 14$ At $x = \frac{4}{3}$: $\left(\frac{4}{3}\right)^3 - 8\left(\frac{4}{3}\right)^2 + 5\left(\frac{4}{3}\right) + 14 = -11\left(\frac{4}{3}\right) + t$ $t = \frac{634}{27} = 23\frac{13}{27} = 23,48$ | $\checkmark \text{equating}$ $\checkmark x\text{-values}$ $\checkmark \text{answer}$ $\checkmark \text{answer}$ |

$$\therefore 14 < t < \frac{634}{27}$$

✓✓ answer

(6)

OR/OF**OR/OF**

$$x^3 - 8x^2 + 5x + 14 = -11x + t$$

✓ equating

$$x^3 - 8x^2 + 5x + 14 + 11x = t$$

$$x^3 - 8x^2 + 16x + 14 = t$$

$$3x^2 - 16x + 16 = 0$$

$$(x - 4)(3x - 4) = 0$$

$$x = 4 \quad \text{or} \quad x = \frac{4}{3}$$

✓ x-values

$$\text{At } x = 4: \quad (4)^3 - 8(4)^2 + 5(4) + 14 = -11(4) + t$$

$$t = 14$$

✓ answer

$$\text{At } x = \frac{4}{3}: \quad \left(\frac{4}{3}\right)^3 - 8\left(\frac{4}{3}\right)^2 + 5\left(\frac{4}{3}\right) + 14 = -11\left(\frac{4}{3}\right) + t$$

$$t = \frac{634}{27} = 23\frac{13}{27} = 23,48$$

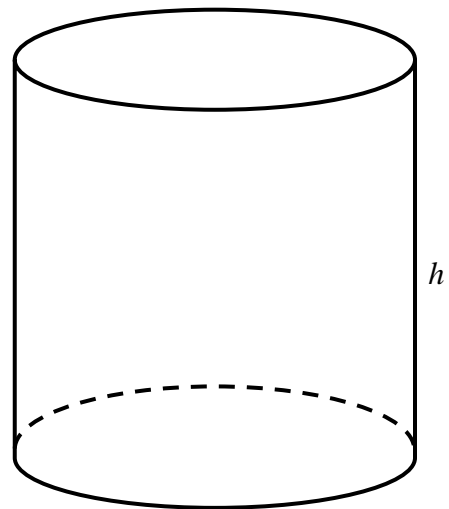
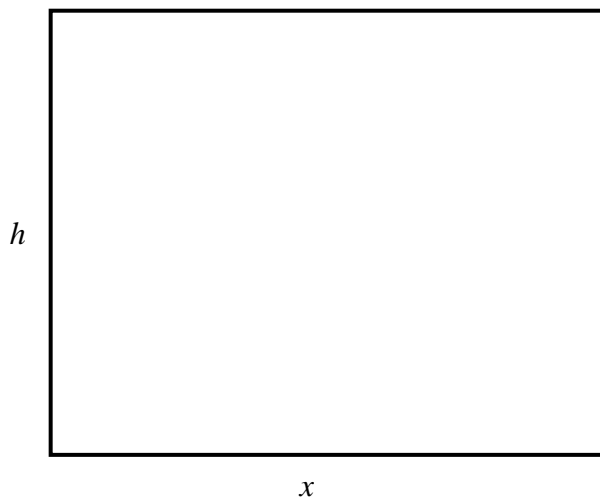
✓ answer

$$\therefore 14 < t < \frac{634}{27}$$

✓✓ answer

(6)

[17]

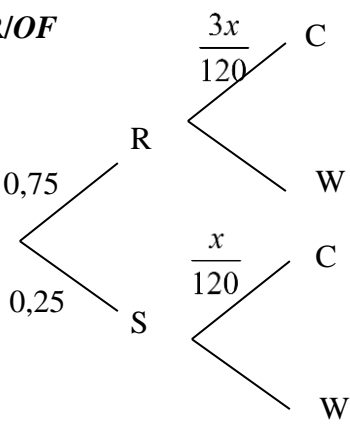
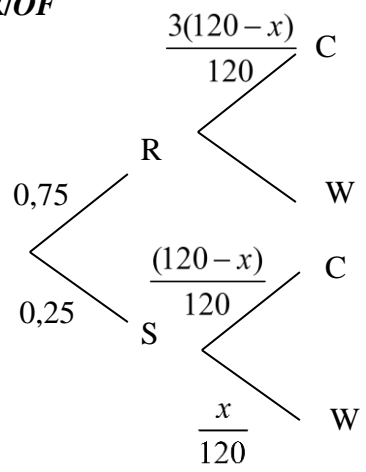
QUESTION/VRAAG 10

| | | |
|------|--|---|
| 10.1 | $2x + 2h = 50$ $h = 25 - x$ $2\pi r = x$ $r = \frac{x}{2\pi}$ $V = \pi r^2 h$ $V = \pi \left(\frac{x}{2\pi} \right)^2 (25 - x)$ $V = \frac{\pi x^2}{4\pi^2} (25 - x)$ $V = \frac{25x^2}{4\pi} - \frac{x^3}{4\pi}$ | $\checkmark 2x + 2h = 50$ $\checkmark r = \frac{x}{2\pi}$ $\checkmark \text{substitution}$ <p style="text-align: right;">(3)</p> |
| 10.2 | $V'(x) = \frac{50x}{4\pi} - \frac{3x^2}{4\pi}$ $V'(x) = \frac{50x}{4\pi} - \frac{3x^2}{4\pi} = 0$ $50x - 3x^2 = 0$ $0 = x(50 - 3x)$ $x \neq 0 \quad \text{or} \quad x = \frac{50}{3}$ $\therefore x = \frac{50}{3} = 16,67$ | $\checkmark \frac{50x}{4\pi} - \frac{3x^2}{4\pi}$ $\checkmark V'(x) = 0$ $\checkmark \text{answer with selection}$ <p style="text-align: right;">(3)</p> |
| | | [6] |

QUESTION/VRAAG 11

| | JUICE | ENERGY DRINKS | TOTAL |
|----------------|--------------|----------------------|--------------|
| Females | <i>a</i> | 72 | 120 |
| Males | 36 | 54 | 90 |
| Total | 84 | 126 | 210 |

| | | |
|--------|--|--|
| 11.1.1 | $P(\text{Male and Prefer juice}) = P(\text{Male}) \times P(\text{Prefer juice})$ $\frac{36}{210} = \frac{90}{210} \times \frac{e}{210}$ $e = 84$ | $\checkmark P(M \text{ and } J) = P(M) \times P(J)$ $\checkmark \frac{36}{210}$ $\checkmark P(\text{Male}) = \frac{90}{210}$ (3) |
| 11.1.2 | $P(\text{Female and like energy drink}) = \frac{b}{210}$ $d = 210 - 84 = 126$ $b = 126 - 54 = 72$ $P(\text{Female and like energy drink}) = \frac{72}{210} = \frac{12}{35} = 0,34$ OR/OF $c = 120$ $b = 72$ $P(\text{Female and like energy drink}) = \frac{72}{210} = \frac{12}{35} = 0,34$ | $\checkmark d\text{-value}$ $\checkmark b\text{-value}$ $\checkmark \text{answer}$ (3) OR/OF $\checkmark c\text{-value}$ $\checkmark b\text{-value}$ $\checkmark \text{answer}$ (3) |

| | | |
|------|---|--|
| 11.2 | <p> $\frac{3}{4}(3x) + \frac{1}{4}x = \frac{7}{12}$ $27x + 3x = 7$ $30x = 7$ $x = \frac{7}{30}$ $\therefore 28 \text{ cups}$ </p> <p>OR/OF</p>  <p> $\frac{75}{100} \times \left(\frac{3x}{120} \right) + \frac{25}{100} \left(\frac{x}{120} \right) = \frac{7}{12}$ $\frac{3}{160}x + \frac{1}{480}x = \frac{7}{12}$ $10x = 280$ $x = 28 \text{ cups of coffee}$ </p> <p>OR/OF</p>  <p> $\frac{75}{100} \times \left(\frac{3(120-x)}{120} \right) + \frac{25}{100} \left(\frac{120-x}{120} \right) = \frac{7}{12}$ $270 - \frac{9}{4}x + 30 - \frac{1}{4}x = 70$ $-\frac{5}{2}x = -230$ $\therefore x = 92 \text{ (bottles of water)}$ $\therefore \text{there are 28 cups of coffee}$ </p> | <p> $\checkmark \frac{3}{4}(3x)$ $\checkmark \frac{1}{4}x$ $\checkmark = \frac{7}{12}$ $\checkmark \text{answer}$ </p> <p>(4)</p> <p>OR/OF</p> <p> $\checkmark \frac{75}{100} \times \left(\frac{3x}{120} \right)$ $\checkmark \frac{25}{100} \left(\frac{x}{120} \right)$ $\checkmark = \frac{7}{12}$ $\checkmark \text{answer}$ </p> <p>(4)</p> <p>OR/OF</p> <p> $\checkmark \frac{75}{100} \times \left(\frac{3(120-x)}{120} \right)$ $\checkmark \frac{25}{100} \left(\frac{120-x}{120} \right)$ $\checkmark = \frac{7}{12}$ $\checkmark \text{answer}$ </p> <p>(4)</p> |
|------|---|--|

| | | |
|--------|---|---|
| 11.3.1 | $7.6! = 5\,040$ OR/OF $7! = 5\,040$ | ✓✓ answer (2) OR/OF ✓✓ answer (2) |
| 11.3.2 | Possible outcomes: $A \times 6 \times 5 \times B \times 4 \times 3 \times 2 \times 1$ $A \times 6 \times 5 \times 4 \times B \times 3 \times 2 \times 1$ $A \times 6 \times 5 \times 4 \times 3 \times B \times 2 \times 1$ $A \times 6 \times 5 \times 4 \times 3 \times 2 \times B \times 1$ $A \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \times B$ $5 \times 6! + 4 \times 6! + 3 \times 6! + 2 \times 6! + 1 \times 6!$ $= 6!(5 + 4 + 3 + 2 + 1)$ $= 6!(15)$ $P(\text{two or more runners finishing after Andrew}) = \frac{6!(15)}{8!}$ $= \frac{15}{56}$ $= 0,27$ OR/OF $\frac{8! - (7!.2 + 2.6.6!)}{8!.2}$ $= \frac{15}{56}$ | ✓✓ $6! (15)$ ✓ $8!$ in denominator ✓ $\frac{6!(15)}{8!}$ or $\frac{15}{56}$ (4) OR/OF ✓ $8!$ in numerator and denominator ✓✓ $(7!.2 + 2.6.6!)$ ✓ $\frac{15}{56}$ (4) |
| | | [16] |

TOTAL/TOTAAL: 150