



**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

SEPTEMBER 2021

**MATHEMATICS P1/WISKUNDE V1
MARKING GUIDELINE/NASIERIGLYN**

MARKS/PUNTE: 150

This marking guideline consists of 22 pages.
Hierdie nasienriglyn bestaan uit 22 bladsye.

NOTE/LET WEL:

- If a candidate answers a question TWICE, mark the FIRST attempt ONLY.
- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk SLEGS die EERSTE poging.
- Consistent accuracy applies in ALL aspects of the marking guideline.
- Volgehoue akkuraatheid geld deurgans in ALLE aspekte van die nasienriglyn.
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.
- Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.
- The mark for substitution is awarded for substitution into the correct formula.
- Die punt vir substitusie word toegeken vir substitusie in die korrekte formule.

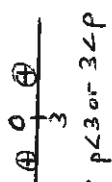
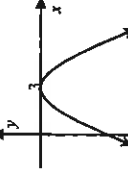
QUESTION 1/VRAAG 1

1.1.1	$x^2 + 2x - 15 = 0$ $(x-3)(x+5) = 0 \quad \checkmark$ $\therefore x = 3 \quad \text{or / of} \quad x = -5 \quad \checkmark$ <p style="text-align: center;">OR/OF</p> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-2 \pm \sqrt{2^2 - 4(1)(-15)}}{2(1)}$ $= \frac{-2 \pm \sqrt{64}}{2}$ $= 3 \quad \text{or / of} \quad -5$	<p>✓ factors / faktore ✓ $x = 3$ ✓ $x = -5$</p> <p style="text-align: center;">OR/OF</p> <p>✓ substitution / vervanging</p> <p>✓ $x = 3$ ✓ $x = -5$</p>	3
1.1.2	$3x^2 + x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-1 \pm \sqrt{1^2 - 4(3)(-1)}}{2(3)} \quad \checkmark$ $= \frac{-1 \pm \sqrt{13}}{6}$ $= 0,43 \quad \text{or / of} \quad -0,77$	<p>✓ substitution / vervanging</p> <p>✓ $x = 0,43$ ✓ $x = -0,77$</p>	3
1.1.3	$x(x-3) \geq -2$ $x^2 - 3x + 2 \geq 0$ $(x-1)(x-2) \geq 0$ $\therefore x \leq 1 \quad \text{or / of} \quad x \geq 2$ <p style="text-align: center;">✓ or 0</p> <p style="text-align: center;">"and": max $\frac{2+1}{2}$</p>	<p>✓ standard form standaardvorm</p> <p>✓ factorisation faktoriserings</p> <p>$x \leq 1$ or/of $x \geq 2$</p>	4

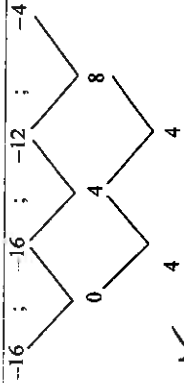
<p>1.1.4</p> $\sqrt{43-x-x+1} = 0$ $\sqrt{43-x-x+1} = x-1 \quad \checkmark$ $(\sqrt{43-x-x+1})^2 = (x-1)^2$ $43-x-x+1 = x^2-2x+1 \quad \checkmark$ $x^2-x-42=0 \quad \checkmark$ $(x-7)(x+6)=0 \quad \checkmark$ $\therefore x=7 \quad \text{or / of} \quad x=-6$ <p style="text-align: right;"><i>x ≠ -6</i> <i>reël</i></p>	<ul style="list-style-type: none"> ✓ isolating the surd <i>isolerings van die wortelvorm</i> ✓ squaring both sides <i>kwadrateer beide kante</i> ✓ standard form / <i>standaardvorm</i> ✓ factorisation / <i>faktorisering</i> ✓ selection / <i>korrekte keuse</i> <p style="text-align: right;">(5)</p>
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5

<p>1.2</p> $2y-x=3 \quad (1)$ $y^2+3x=2xy \quad (2)$ $x=2y-3 \quad \checkmark \quad (3)$ <p>Substitute (3) into (2) / <i>Vervang (3) in (2)</i></p> $y^2+3(2y-3)=2y(2y-3) \quad \checkmark$ $y^2+6y-9-4y^2+6y=0$ $-3y^2+12y-9=0$ $y^2-4y+3=0 \quad \checkmark$ $(y-3)(y-1)=0$ $\therefore y=3 \text{ or / of } y=1 \quad \checkmark$ $x=2(3)-3 \quad \text{or / of} \quad x=2(1)-3$ $=3 \quad \text{or} \quad =-1 \quad \checkmark$	<ul style="list-style-type: none"> ✓ $x=2y-3$ ✓ substitution / <i>vervanging</i> ✓ standard form / <i>standaardvorm</i> ✓ factorisation / <i>faktorisering</i> ✓ y-values / <i>y-waardes</i> ✓ x-values <p style="text-align: center;">OR/OF</p>
<p style="text-align: center;">OR/OF</p> $2y-x=3 \quad (1)$ $y^2+3x=2xy \quad (2)$ $y=\frac{x+3}{2} \quad (3)$ <p>Substitute (3) into (2) / <i>Vervang (3) in (2)</i></p> $\left(\frac{x+3}{2}\right)^2+3x=2x\left(\frac{x+3}{2}\right)$ $\frac{x^2+6x+9}{4}+\frac{3x}{1}=\frac{2x^2+6x}{2}$ $\frac{3x^2+6x+9}{4}=\frac{2x^2+6x}{2}$ $-3x^2+6x+9=0$ $x^2-2x-3=0$ $(x-3)(x+1)=0$ $\therefore x=3 \text{ or / of } x=-1$ $y=\left(\frac{3+3}{2}\right) \quad \text{or / of} \quad y=\left(\frac{-1+3}{2}\right)$ $=3 \quad \text{or} \quad =1$	<ul style="list-style-type: none"> ✓ $y=\frac{x+3}{2}$ ✓ substitution / <i>vervanging</i>

	<ul style="list-style-type: none"> ✓ standard form / standaardvorm ✓ factorisation / faktorisering ✓ x-values / x-waardes ✓ y-values / y-waardes 	(5)
1.3	$x = \frac{5 \pm \sqrt{p(6-p)} - 9}{2}$ <p>For non-real roots: / Vir nie-reële wortels:</p> $\Delta < 0$ $p(6-p) - 9 < 0$ $-p^2 + 6p - 9 < 0$ $p^2 - 6p + 9 > 0$ $(p-3)^2 > 0$ $\therefore p \in \mathbb{R} \text{ but/maar } p \neq 3$ <p style="text-align: center;">OR/OF</p> $x = \frac{5 \pm \sqrt{p(6-p)} - 9}{2}$ <p>For non-real roots: / Vir nie-reële wortels:</p> $\Delta < 0$ $p(6-p) - 9 < 0$ $-p^2 + 6p - 9 < 0$ $(3-p)(p-3) < 0$ $\therefore p \in \square \text{ but/maar } p \neq 3$	 
	<ul style="list-style-type: none"> ✓ standard form / standaardvorm ✓ factorisation / faktorisering ✓ answer / antwoord 	(4)
	<ul style="list-style-type: none"> ✓ standard form / standaardvorm ✓ factorisation / faktorisering ✓ answer / antwoord 	[24]

QUESTION 2/VRAAG 2

2.1.1		(1)	
2.1.2	8 $2a = 4$ $\therefore a = 2$ $3a + b = 0$ $3(2) + b = 0$ $\therefore b = -6$ $a + b + c = -16$ $2 - 6 + c = -16$ $\therefore c = -12$ $T_n = 2n^2 - 6n - 12$	<ul style="list-style-type: none"> ✓ 8 ✓ $a = 2$ ✓ $b = -6$ ✓ $c = -12$ ✓ $T_n = 2n^2 - 6n - 12$ 	4
2.1.3	$T_{38} = 2(38)^2 - 6(38) - 12$ $= 2648$	<ul style="list-style-type: none"> ✓ substitution / vervanging ✓ answer / antwoord 	(2)

2.1.4	<p>General term for first differences: <i>Algemene term vir eerste verskille</i> $T_n = 4n - 4$ $400 = 4n - 4$ ✓ $\therefore n = 101$ T_n (linear/lineêr) = $(T_{n+1} - T_n)$ (quadratic/kwadraties) $\therefore n = 101$ and / en $n + 1 = 102$ ✓ The terms are / Die terme is: 101 and / en 102 ✓ OR/OF $2(n+1)^2 - 6(n+1) - 12 - (2n^2 - 6n - 12) = 400$ $2n^2 + 4n + 2 - 6n - 6 - 12 - 2n^2 + 6n + 12 = 400$ $4n - 4 = 400$ $4n = 404$ $\therefore n = 101$ \therefore Between/Tussen T_{101} and / en T_{102} OR/OF Trial and error / Proefneming $T_{102} = 2(102)^2 - 6(102) - 12 = 20184$ $T_{101} = 2(101)^2 - 6(101) - 12 = 19784$ Difference / Verskil : 400 \therefore Between/Tussen T_{101} and / en T_{102} (3)</p>	<p>✓ $T_n = 4n - 4$ ✓ $T_n = 400$ ✓ answer / antwoord OR/OF ✓ $4n - 4 = 400$ ✓ ✓ answer / antwoord OR/OF ✓ subst. for T_{101} and T_{102} verw. vir T_{101} en T_{102} ✓ 400 ✓ answer / antwoord (3)</p>
2.2.1	<p>$T_n = a + (n-1)d$ $89 = 2 + (n-1)(3)$ ✓ $3n - 1 = 89$ $3n = 90$ $n = 30$ ✓</p>	<p>✓ substitution / vervanging ✓ answer / antwoord (2)</p>

3

2

2.2.2	<p>k is the sum to 30 terms / is die som tot 30 terme. $S_n = \frac{n}{2}[a + l]$ $= \frac{30}{2}[2 + 89]$ $= 1365$ OR / OF $S_n = \frac{n}{2}[2a + (n-1)d]$ $= \frac{30}{2}[2(2) + (30-1)(3)]$ ✓ $= 1365$ ✓</p>	<p>✓ Sum formula / Som formule ✓ substitution / vervanging ✓ answer / antwoord OR / OF ✓ Sum formula / Som formule ✓ substitution / vervanging ✓ answer / antwoord (3)</p>
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3

QUESTION 4/VRAAG 4

	<p>4.1 $D(0; 1)$ ✓ 4.2 $x = -2$; $y = -1$ ✓ $x \in \mathbb{R}$ but <u>not</u> $x \neq -2$ ✓ ✓ 4.3 ✓ ✓ ✓ 4.4 $g(x) = b^x$ Sub $E(3; \frac{1}{3})$ $\frac{1}{3} = b^3$ ✓ $(\frac{1}{8})^{\frac{1}{3}} = (b^3)^{\frac{1}{3}}$ or $\sqrt[3]{\dots}$ $\therefore b = \frac{1}{2}$ ✓ 4.5 $y = \frac{-3}{x+2} - 1$ $0 = \frac{-3}{x+2} - 1$ $1 = \frac{-3}{x+2}$ $x+2 = -3$ $x = -5$ $\therefore A(-5; 0)$ ✓ $y = \frac{-3}{0+2} - 1$ $= -\frac{5}{2}$ $\therefore C(0; -\frac{5}{2})$ ✓</p>	<p>✓ $(0; 1)$ (1) ✓ $x = -2$ ✓ $y = -1$ (2) ✓ $x \in \mathbb{R} \vee x \neq -2$ (2)</p> <p>✓ substitution / vervanging ✓ answer / antwoord (2) ✓ substitution $y = 0$ / $y = -1$ / $y = 0$ ✓ $x = -5$ ✓ $y = -\frac{5}{2}$ (3)</p>
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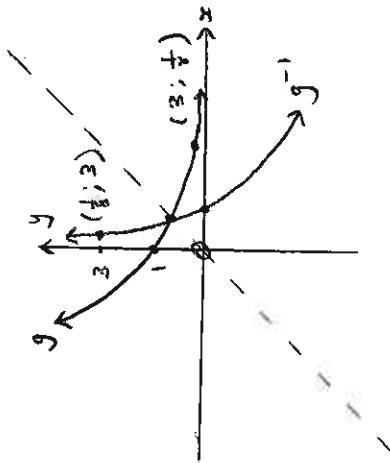
QUESTION 3/VRAAG 3

<p>3.1 $T_0 = ar^0 = 768$ $T_3 = ar^3 = 12288$ $\frac{ar^3}{ar^0} = \frac{12288}{768}$ ✓ $\therefore r^3 = 16$ $r = \pm 2$ ✓ \pm $a = \frac{768}{(\pm 2)^3}$ $= 3$ ✓</p>	<p>✓ $\frac{ar^3}{ar^0} = \frac{12288}{768}$ ✓ $r = \pm 2$ ✓ value of a / waarde van a (3)</p>
<p>3.2.1 $S_2 = \frac{54}{19} - \frac{24}{19}$ $= \frac{30}{19}$ ✓ \rightarrow</p>	<p>✓ answer / antwoord (1)</p>
<p>3.2.2 $T_1 + T_2 = \frac{30}{19}$ $a + ar = \frac{30}{19}$ ✓ 30 $a(1+r) = \frac{30}{19}$ $a = \frac{30}{19(1+r)}$</p>	<p>✓ $a + ar = \frac{30}{19}$ ✓ answer / antwoord (1)</p>
<p>3.2.3 $S_n = \frac{a}{1-r} = \frac{54}{19}$ ✓ $\therefore a = \frac{54(1-r)}{19}$ $a = \frac{30}{19(1+r)}$ from / vanaf (3.2.2) $\therefore \frac{54(1-r)}{19} = \frac{30}{19(1+r)}$ ✓ $(1-r)(1+r) = \frac{30}{54}$ $1-r^2 = \frac{5}{9}$ $r^2 = \frac{4}{9}$ ✓ $\therefore r = \frac{2}{3}$ ✓ $r > 0$</p>	<p>✓ $a = \frac{54(1-r)}{19}$ ✓ equating / gelykstel ✓ $r^2 = \frac{4}{9}$ ✓ answer / antwoord (4)</p>

4.6	$x = \left(\frac{1}{2}\right)^y$ ✓ $\therefore y = \log_{\frac{1}{2}} x$ ✓ $y = 2^{-x}$ $\therefore x = 2^{-y}$ $y = -\log_2 x$	$x = \left(\frac{1}{2}\right)^y$ $y = \log_{\frac{1}{2}} x$ $x = 2^{-y}$ $y = -\log_2 x$	OR/OF OR/OF OR/OF	(2) (2)
4.7				
4.7.1	$-5 < x < -2$	$x \in (-5; -2)$	OR/OF	✓✓ answer / antwoord (2)
4.7.2	$0 < x \leq \frac{1}{8}$	$x \in (0; \frac{1}{8}]$	OR/OF	✓✓ answer / antwoord (2)

Accuracy
VV or O

Must have
 $x \in$
for interval
not



$g^{-1}(x) \geq 3$
 $y_{g^{-1}} \geq 3$

$x \in (0; \frac{1}{8}]$

QUESTION 5/VRAAG 5

5.1		$-x^2 - 2x + 8 = 0$ ✓ $x^2 + 2x - 8 = 0$ $(x+4)(x-2) = 0$ ✓ $\therefore x = -4$ or / of $x = 2$ ✓ $\therefore R(-4; 0)$ and / en $S(2; 0)$ ✓ $\therefore RS = 6$ units / eenhede ✓	$f(x) = 0$ ✓ factorisation / faktorisering ✓ values of x / waardes van x ✓ answer / antwoord (4)
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4

5.2	$x = \frac{-4+2}{2}$ $= -1$ $y = -(-1)^2 - 2(-1) + 8$ $= 9$ $\therefore T(-1; 9)$ <p style="text-align: center;">OR/OF</p> $f(x) = -x^2 - 2x + 8$ $x = -\frac{b}{2a}$ $= -\left(\frac{-2}{2(-1)}\right)$ $= -1$ $y = -(-1)^2 - 2(-1) + 8$ $= 9$ $\therefore T(-1; 9)$	<p>✓ method / metode</p> <p>✓ $x = -1$</p> <p>✓ $y = 9$</p> <p style="text-align: center;">OR/OF</p> <p>✓ $-\frac{b}{2a}$</p> <p>✓ $x = -1$</p> <p>✓ $y = 9$</p>	
5.3.1	$f(x) = -x^2 - 2x + 8$ $f'(x) = -2x - 2$ $\therefore -2x - 2 = 2 \quad \checkmark \text{f equate}$ $\therefore x = -2$ $\therefore y = -(-2)^2 - 2(-2) + 8$ $= 8$ $\therefore W(-2; 8)$	<p>✓ $f'(x)$</p> <p>✓ $f'(x) = 2$</p> <p>✓ $x = -2$</p> <p>✓ $y = 8$</p>	(3)
5.3.2	$g(x) = mx + c$ $m = -\frac{1}{2} \quad (\perp \text{ lines / hgne})$ $c = 8 \quad \checkmark$ $\therefore y = -\frac{1}{2}x + 8$	<p>✓ gradient / gradient</p> <p>✓ equation / vergelyking</p>	(2)

4

5.4	$f(x) = -x^2 - 2x + 8$ $h(x) = -f(x-1)$ $= -[-(x-1)^2 - 2(x-1) + 8]$ $= -[-(x^2 - 2x + 1) - 2x + 2 + 8]$ $= -[-x^2 + 2x - 1 - 2x + 2 + 8]$ $= x^2 - 9 \quad \checkmark \text{refl}$ <p style="text-align: center;">OR/OF</p> $h(x) = (x+3)(x-3)$ $= x^2 - 9 \quad \checkmark \text{ans}$ <p style="text-align: center;">OR/OF</p> <p>New turning point / Nuwe draaipunt = (0; -9)</p> $y = x^2 - 9$	<p>✓ $-f(x-1)$</p> <p>✓ substitution / vervanging</p> <p>✓ simplifying / vereenvoudiging</p> <p>✓ equation / vergelyking</p> <p style="text-align: center;">OR/OF</p> <p>✓ roots/wortels 3 and/en -3</p> <p>✓ $+(x+3)(x-3)$</p> <p>✓ equation / vergelyking</p> <p style="text-align: center;">OR/OF</p> <p>✓ (0; \checkmark -9)</p> <p>✓ equation / vergelyking</p>	(4)
QUESTION 6/VRAAG 6		(17)	

6.1	$A = P(1+i)^n$ $5509,70 = 9670(1+i)^4$ $\therefore i = 1 - \sqrt[4]{\frac{5509,70}{9670}}$ $= 0,1311 \dots$ $I = 13,12\%$	<p>✓ subst. into correct formula</p> <p>✓ <i>vervang in korrekte formule</i></p> <p>✓ simplification</p> <p>✓ vereenvoudiging</p> <p>✓ answer / antwoord</p>	(3)
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3

6.2 End of December / Einde van Desember

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$\therefore F = \frac{600 \left[\left(1 + \frac{0,087}{12}\right)^{144} - 1 \right]}{0,087/12}$$

$$= R 151 438,20$$

End of January / Einde van Januarie

$$A = P(1+i)^n$$

$$= 151 438,20 \left(1 + \frac{0,087}{12}\right)$$

$$= R 152 536,13$$

OR/OF

$$F = \frac{x[(1+i)^n - 1](1+i)}{i}$$

$$\therefore F = \frac{600 \left[\left(1 + \frac{0,087}{12}\right)^{144} - 1 \right] \left(1 + \frac{0,087}{12}\right)}{0,087/12}$$

$$= R 152 536,13$$

6.3.1

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$350 000 = \frac{x \left[1 - \left(1 + \frac{0,093}{12}\right)^{-72} \right]}{0,093/12}$$

$$\therefore x = \frac{350 000 \times 0,093}{12}$$

$$\therefore x \approx R 6361,18$$

6.3.2

Outstanding balance = / Uitstaande balans =

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$\therefore P = \frac{6361,18 \left[1 - \left(1 + \frac{0,093}{12}\right)^{-32} \right]}{0,093/12}$$

$$= R 179 667,32$$

OR/OF

Outstanding balance / Uitstaande balans

$$= A - F = 350 000 \left(1 + \frac{0,093}{100}\right)^{40} - \frac{6361,18 \left[\left(1 + \frac{0,093}{12}\right)^{40} - 1 \right]}{0,093/12}$$

$$= R 476 628,84 - R 296 961,79$$

$$= R 179 667,05$$

(3)

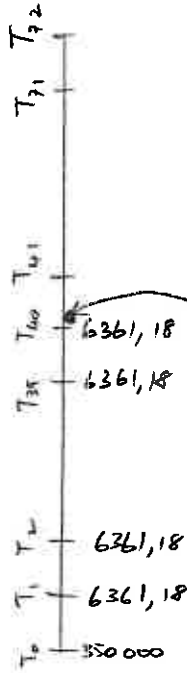
n = 32
0/3

n = 40
0/3

3

4

3



6.3.2.

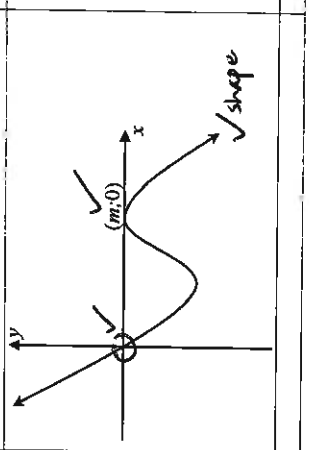


<p>6.3.3</p>	<p> $\checkmark \frac{179667,32}{7000} = \frac{0,093}{12} \left[1 - \left(1 + \frac{0,093}{12} \right)^{-n} \right]$ $\frac{179667,32 \times 0,093}{7000} \div \frac{0,093}{12} = 1 - \left(1 + \frac{0,093}{12} \right)^{-n}$ $-0,80108... = - \left(\frac{4031}{4000} \right)^{-n}$ $\therefore 0,80108... = \frac{4031^{-n}}{4000}$ $\therefore -n = \frac{\log 0,80108...}{\log \frac{4031}{4000}}$ $-n \approx -28,73$ $\therefore n \approx 28,73$ <p> NB round up The number of months is 29 Die aantal maande is 29. </p> </p>
<p>subst. into correct formula verwagting in korrekte formule</p>	<p> $\checkmark = 28,73$ $\checkmark n = 29 \text{ months / maande}$ </p>
<p>OR/OF</p>	<p>OR/OF</p>
<p>subst. into correct formula verwagting in korrekte formule</p>	<p> $\checkmark = 28,73$ $\checkmark n = 29 \text{ months / maande}$ </p>
<p>OR/OF</p>	<p>OR/OF</p>

QUESTION 7/VRAG 7

<p>7.1</p>	<p> $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{5 - 2(x+h)^2 - (5 - 2x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{5 - 2x^2 - 4xh - 2h^2 - 5 + 2x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{-4xh - 2h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$ $= \lim_{h \rightarrow 0} (-4x - 2h)$ $= -4x$ </p>	<p> ✓ substitution / vervanging ✓ expansion / uitbreiding ✓ simplification / vereenvoudiging ✓ notation and $\lim_{h \rightarrow 0} (-4x - 2h)$ ✓ answer / antwoord </p>
<p>7.2.1</p>	<p> $y = 7x^4 + \frac{2x^2}{\sqrt{x}}$ $= 7x^4 + 2x^{\frac{3}{2}}$ $\therefore \frac{dy}{dx} = 28x^3 + 3x^{\frac{1}{2}}$ </p>	<p> ✓ $2x^{\frac{3}{2}}$ ✓ $28x^3 + 3x^{\frac{1}{2}}$ </p>
<p>7.2.2</p>	<p> $= D_x \left[\frac{3x^2 - 7x - 6}{x} \right]$ $= D_x \left[\frac{3x - 7 - 6x^{-1}}{1} \right]$ $= 3 + 6x^{-2}$ </p>	<p> ✓ $3x - 7$ ✓ 3 and differentiating constant 3 en afgeleide van konstante ✓ $+6x^{-2}$ </p>
		<p>(4) 12</p>

QUESTION 8/VRAAG 8

8.1.1	$f(x) = 2(x-x_1)(x-x_2)(x-x_3)$ $= 2(x+1)(x-\frac{1}{2})(x-3)$ $= (x+1)(2x-1)(x-3)$ $= (x+1)(2x^2 - 7x + 3)$ $= 2x^3 - 7x^2 + 3x + 2x^2 - 7x + 3$ $= 2x^3 - 5x^2 - 4x + 3$	$f(x) = 2(x+1)(x-\frac{1}{2})(x-3)$ OR/OF $f(x) = (x+1)(2x-1)(x-3)$ expansion / uitbreiding simplifying / vereenvoudiging	(4)
8.1.2	$f(x) = 2x^3 + bx^2 + cx + d$ $\therefore b = -5, c = -4, d = 3$ $f'(x) = 6x^2 - 10x - 4$ $0 = 6x^2 - 10x - 4$ $\therefore 3x^2 - 5x - 2 = 0$ $(3x+1)(x-2) = 0$ reject $\therefore x \neq -\frac{1}{3}$ or/of $x = 2$ $\therefore N$ is at $f(2)$ $f(2) = 2(2)^3 - 5(2)^2 - 4(2) + 3$ $= -9$ $\therefore N(2; -9)$	$f'(x) = 6x^2 - 10x - 4 = 0$ factorisation / faktorisering choosing/kies : $x = 2$ $y = -9$	(4)
8.1.3 (a)	$-\frac{1}{2} < x < 2$	$x \in (-\frac{1}{2}; 2)$	(2)
8.1.3 (b)	$f''(x) = 12x - 10$ $12x - 10 < 0 \checkmark < 0$ $12x < 10$ $\therefore x < \frac{5}{6}$ OR/OF $x = \frac{-\frac{1}{2} + 2}{2} = \frac{5}{6}$ $\therefore x < \frac{5}{6}$	$f'(x) = 12x - 10$ $f''(x) < 0$ answer / antwoord OR/OF $x = \frac{5}{6}$ $x < \frac{5}{6}$ OR/OF $x \in (-\infty; \frac{5}{6})$	(3)
8.2		$f(0) = 0$ $(m; 0)$ shape / vorm	(3)

QUESTION 9/VRAAG 9

9.1	$A = (\frac{1}{2} \times 15x \times 8x \times 2) + (15xy) + (8xy) + (17xy)$ $5760 = 120x^2 + 40xy$ $\therefore y = \frac{5760 - 120x^2}{40x}$	total surface area / totale buite-oppervlakte $5760 = 120x^2 + 40xy$	(2)
9.2	$V = (\frac{1}{2} \times b \times h) \times H$ $V = \frac{1}{2} \times 15x \times 8x \times y$ $= \frac{1}{2} \times 15x \times 8x \times \frac{5760 - 120x^2}{40x}$ $= 60x(144 - 3x^2)$ $= 8640x - 180x^3$	substitution into V vervanging in V substituting for y vervanging van y	(2)
9.3	$V'(x) = 8640 - 540x^2$ $V''(x) = 0$ $\therefore 8640 - 540x^2 = 0$ $8640 = 540x^2$ $x^2 = 16$ $\therefore x = 4$	$V'(x) = 8640 - 540x^2$ $V''(x) = 0$ $\therefore 8640 - 540x^2 = 0$ $8640 = 540x^2$ $x^2 = 16$ $\therefore x = 4$ reject -	(4)

QUESTION 11/VRAAG 11

11.1	<p>@@@ ###</p> <p>$\frac{20 \times 22 \times 21 \times 10 \times 10 \times 10}{9240000}$ ✓</p>	<p>✓ $\frac{20 \times 22 \times 21}{10 \times 10 \times 10}$</p> <p>✓ answer / antwoord</p>	(3)	8
11.2	<p>$\frac{20 \times 19 \times 3 \times 10 \times 10 \times 20 \times 3 \times 19 \times 10 \times 10 \times 5}{9240000}$ ✓</p> <p>$\frac{1140000}{9240000}$ ✓</p> <p>$\frac{19}{154}$ or / of 0,12 or / of 12,34% ✓</p>	<p>✓ $\frac{20 \times 19 \times 3 \times 10 \times 10 \times 5}{20 \times 19 \times 3 \times 10 \times 10 \times 5}$</p> <p>✓ adding / optel</p> <p>✓ 9240000</p> <p>✓ answer / antwoord</p>	(5)	8

TOTAL/TOTAAL: 150

11.1. $\frac{20}{20} \frac{22}{22} \frac{21}{21} = 23$
 $\frac{26}{26} - \frac{3}{3} = 23$
 $= a i u + 20$
 $22 = a i u + 19$

11.2. $\frac{20}{20} \frac{19}{19} \frac{3}{3} \frac{10}{10} \frac{10}{10} \frac{5}{5}$
 $\frac{20}{20} \frac{19}{19} \frac{3}{3} \frac{10}{10} \frac{10}{10} \frac{5}{5}$
 $a i u = 3$
 $0 2 4 6 8 = 5$

QUESTION 10/VRAAG 10

10.1.1	<p>$P(B) = 1 - P(\text{not}/nie B)$ $= 1 - 0,45$ $= 0,55$ ✓</p>	<p>✓ 0,55</p>	(1)	8
10.1.2	<p>$P(A \text{ and}/en B) = P(A) \times P(B)$ $= 0,2 \times 0,55$ ✓ $= 0,11$</p> <p>$P(A \text{ or}/of B) = P(A) + P(B) - P(A \text{ and}/en B)$ $= 0,2 + 0,55 - 0,11$ ✓ $= 0,64$ or / of $\frac{16}{25}$ ✓</p>	<p>✓ $P(A) \times P(B)$</p> <p>✓ substitution / vervanging</p> <p>✓ answer / antwoord</p>	(3)	8
10.2	<p> </p> <p> $P(\text{late}/laat) = \frac{1}{2}x + \frac{3}{5}(1-x)$ $\frac{1}{2}x + \frac{3}{5}(1-x) = \frac{8}{15}$ $15x + 18(1-x) = 16$ $15x + 18 - 18x = 16$ $-3x = -2$ $x = \frac{2}{3}$ ✓ </p>	<p>$\frac{1}{2}x + \frac{3}{5}(1-x)$</p> <p>✓ equating / gelyk stel</p> <p>✓ substitution / vervanging</p> <p>✓ answer / antwoord</p>	(4)	8