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NATIONAL SENIOR CERTIFICATE
NASIONALE SENIOR SERTIFIKAAT

GRADE/*GRAAD* 12

SEPTEMBER 2026

MATHEMATICS P1 MARKING GUIDELINE / *WISKUNDE V1 NASIENRIGLYN*

MARKS/*PUNTE*: **150**

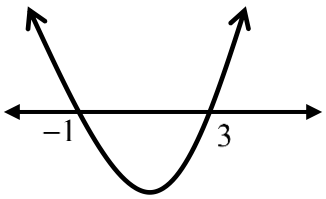
This marking guideline consists of 15 pages./
Hierdie nasienriglyn bestaan uit 15 *bladsye*.

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NOTE/*LET OP*:

- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.
  Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, merk SLEGS die EERSTE poging.
- Consistent accuracy(CA) applies in ALL aspects of the memorandum.
  Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die memorandum.
- 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/*VRAAG 1*

1.1	1.1.1	$2x(x-3)=0$ $2x=0$ or/*of* $x-3=0$ $x=0$ or/*of* $x=3$	✓ factors / *faktore* ✓ both answers / *beide antwoorde* (2)
	1.1.2	$2x^2+5x+1=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(5)\pm\sqrt{(5)^2-4(2)(1)}}{2(2)}$ $x=\frac{-5\pm\sqrt{17}}{4}$ $\therefore x=-0,22$ or / *of* $x=-2,28$ Penalise 1 mark for incorrect rounding off./ *Penaliseer* 1 *punt vir verkeerde afronding.*	✓ standard form / *standaardvorm* ✓ substitution / *vervanging* ✓answer / *antwoord* ✓ answer / *antwoord* (4)
	1.1.3	$-x^2+2x+3>0$ $x^2-2x-3<0$ $(x-3)(x+1)<0$ *c.v's / kritieke waardes* : $x\in\{-1;3\}$  $-1<x<3$	✓ standard form / *standaardvorm* ✓ critical values / *kritieke waardes* ✓✓ $-1<x<3$ (accuracy / *akkuraatheid*) **OR/*OF*** ✓✓ $x\in(-1\ ;\ 3)$ (4)

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	1.1.4	$25^x - 26.5^x + 25 = 0$ $\left(5^x\right)^2 - 26.5^x + 25 = 0$ $\left(5^x - 25\right)\left(5^x - 1\right) = 0$ $5^x = 25$ or / *of* $5^x = 1$ $5^x = 5^2$ or / *of* $5^x = 5^0$ $x = 2$ or / *of* $x = 0$ **OR / *OF*** $\left(5^x\right)^2 - 26.5^x + 25 = 0$ let / *laat* : $5^x = k$ $k^2 - 26k + 25 = 0$ $(k - 25)(k - 1) = 0$ $k = 25$ or / *of* $k = 1$ $5^x = 5^2$ or / *of* $5^x = 5^0$ $x = 2$ or / *of* $x = 0$	✓ quadratic form / *kwadratiese vorm* ✓ factors/ *faktore* ✓ both equations / *beide vergelykings* ✓ both answers / *beide antwoorde* **OR/*OF*** ✓ quadratic standard form/ *kwadratiese standaardvorm* ✓ factors/ *faktore* ✓ both equations (after substitution)/ *beide vergelyking (na vervanging)* ✓ both answers / *beide antwoorde* (4)

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1.2	$2x-y=1$ .....(1) $x^2-y^2=xy-11$ .....(2) From / *Vanaf* (1) : $y=2x-1$ .....(3) (3) into/*in* (2) : $(2x-1)^2-(2x-1)^2=x(2x-1)-11$ $x^2-(4x^2-4x+1)=2x^2-x-11$ $x^2-4x^2+4x-1=2x^2-x-11$ $-5x^2+5x+10=0$ $x^2-x-2=0$ $(x-2)(x+1)=0$ $x=2$ or/*of* $x=-1$ $y=3$ or/*of* $y=-3$ **OR / OF** 2x - y = 1 .....(1) $x^2-y^2=xy-11$ .....(2) From / *Vanaf* (1) : $x=\frac{y+1}{2}$ .....(3) (3) into/*in* (2) : $\left(\frac{y+1}{2}\right)^2-y^2=\left(\frac{y+1}{2}\right)y-11$ $\frac{(y+1)^2}{4}-y^2=\frac{y(y+1)}{2}-11$ $\frac{y^2+2y+1}{4}-y^2=\frac{y^2+y}{2}-11$ $y^2+2y+1-4y^2=2y^2+2y-44$ $-5y^2=-45$ $y^2-9=0$ $(y-3)(y+3)=0$ $y=3$ or/*of* $y=-3$ $x=2$ or/*of* $x=-1$	✓ $y=2x-1$ ✓ substitution / *vervanging* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ *x*-values / *waardes* ✓ *y*-values / *waardes* **OR/*OF*** ✓ $x=\frac{y+1}{2}$ ✓ substitution / *vervanging* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ *y*-values / *waardes* ✓ *x*-values / *waardes* (6)

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1.3	$m\left(n\left(x\right)\right)=\frac{1}{2}$ $\left(3\left(\frac{x+2}{\sqrt{x+5}}\right)-2\right)\div\left(4\left(\frac{x+2}{\sqrt{x+5}}\right)\right)=\frac{1}{2}$ $\left(\frac{3x+6}{\sqrt{x+5}}-2\right)\div\left(\frac{4x+8}{\sqrt{x+5}}\right)=\frac{1}{2}$ $\frac{3x+6-2\sqrt{x+5}}{\sqrt{x+5}}\times\frac{\sqrt{x+5}}{4x+8}=\frac{1}{2}$ $\frac{3x+6-2\sqrt{x+5}}{2\left(2x+4\right)}=\frac{1}{2}$ $2x+4=3x+6-2\sqrt{x+5}$ $2\sqrt{x+5}=x+2$ $4x+20=x^2+4x+4$ $x^2-16=0$ $\left(x+4\right)\left(x-4\right)=0$ $x=4$ or/*of* $x\neq -4$	✓ substitution /*vervanging* ✓ adding fractions / *optel van breuke* ✓simplification/ *vereenvoudiging* ✓ standard form / *standaardvorm* ✓ answer with selection *antwoord met keuse* (5)
		[25]

QUESTION/*VRAAG 2*

2.1	2.1.1	7; 16; 25; 34;..... $a=7$ and $d=9$ $T_n=7+\left(n-1\right)\left(9\right)$ $=7+9n-9$ $=9n-2$	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
	2.1.2	$T_{35}=9\left(35\right)-2$ $=313$	✓ answer / *antwoord* (1)
	2.1.3	$S_{35}=\frac{35}{2}\left[2\left(7\right)+\left(35-1\right)\left(9\right)\right]$ $=5\ 600$ **OR / *OF*** $S_{35}=\frac{35}{2}\left(7+313\right)$ $=5\ 600$	✓ substitution / *vervanging* ✓ answer / *antwoord* **OR/*OF*** ✓ substitution / *vervanging* ✓ answer / *antwoord* (2)

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	2.1.4	$8\,600 = \frac{n}{2}\left[2(7)+(n-1)(9)\right]$ $17\,200 = n(14+9n-9)$ $17\,200 = n(9n+5)$ $17\,200 = 9n^2+5n$ $9n^2+5n-17\,200 = 0$ $n = \frac{-5 \pm \sqrt{(5)^2-4(9)(-17200)}}{2(9)}$ $n = 43,44$ or / *of* $n = -43,99$ $\therefore n = 43$	✓ equating 8 600 to S_n *Stel* $S_n = 8\,600$ ✓ simplification / *vereenvoudiging* ✓ substitution / *vervanging* ✓ answer / *antwoord* (4)
2.2	2.2.1	Side $= \frac{1}{2}$ units/ *eenheid*	✓ answer / *antwoord* (1)
	2.2.2	$\left(\frac{1}{2}\right)^2 = \left(\frac{1}{4}\right)^2 + h^2 \quad (\text{Pyth.})$ $h = \frac{\sqrt{3}}{4}$ Area $= \left(\frac{1}{2}\right)^2 \times \frac{\sqrt{3}}{4}$ $= \frac{\sqrt{3}}{16}\text{units}^2 / \textit{eenhede}^2$	✓ height / *hoogte* ✓ area / *oppervlakte* (2)
	2.2.3	$\left(\frac{1}{4}\right)^2 = \left(\frac{1}{8}\right)^2 + h^2 \quad (\text{Pyth.})$ $h = \frac{\sqrt{3}}{8}$ Area $= \frac{1}{2} \times \frac{1}{4} \times \frac{\sqrt{3}}{8}$ $= \frac{\sqrt{3}}{64}\text{units}^2 / \textit{eenhede}^2$ $\frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{16} + \frac{\sqrt{3}}{64} + \ldots$ $a = \frac{\sqrt{3}}{4}$ and/*en* $r = \frac{1}{4}$ $S_\infty = \frac{\frac{\sqrt{3}}{4}}{1-\frac{1}{4}}$ $= \frac{\sqrt{3}}{3}\text{units}^2 / \textit{eenhede}^2$	✓ area / *oppervlakte* ✓ common ratio / *gemene verhouding* ✓ substitution/ *vervanging* ✓ answer / *antwoord* (4)

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2.3	$T_n = S_n - S_{n-1}$ $= n(n+1)(2n+3) - (n-1)n(2n+1)$ $= n\left[(n+1)(2n+3) - (n-1)(2n+1)\right]$ $= n\left(2n^2 + 5n + 3 - 2n^2 + n + 1\right)$ $= n(6n+4)$ $= 6n^2 + 4n$ $T_4 = 6(4)^2 + 4(4) = 112$ **Alternative solution/*Alternatiewe oplossing*:** $T_1 = S_1 \quad ; \quad T_2 = S_2 - S_1 \quad ; \quad T_3 = S_3 - S_2 \quad ; \quad T_4 = S_4 - S_3$ $\therefore \quad T_4 = S_4 - S_3$ $= 4(4+1)[2(4)+3] - 3(3+1)[2(3)+3]$ $= 220 - 108$ $= 112$	✓ $S_n - S_{n-1}$ ✓ simplification/ *vereenvoudiging* ✓ Substitution/ *vervanging* ✓ answer / *antwoord* ✓ $S_n - S_{n-1}$ ✓ substitution / *vervanging* ✓ simplification / *vereenvoudiging* ✓ answer / *antwoord* (4)
		[20]

QUESTION/*VRAAG 3*

3.1	**-3 ; -6 ; -11 ; -18 ; -27** **-3 ; -5 ; -7 ; -9** **-2 ; -2 ; -2** $-18; -27$	✓ -18 ; -27 (1)
3.2	$2a = -2$ $\quad 3a + b = 3$ $\quad a + b + c = 1$ $a = -1$ $\quad 3(-1) + b = -3$ $\quad -1 + 0 + c = -3$ $b = 0$ $\quad c = -2$ $\therefore \ T_n = -n^2 - 2$	✓ $2a = -2$ ✓ $3(-1) + b = -3$ ✓ $-1 + 0 + c = -3$ (3)
3.3	$-n^2 - 2 = -2603$ $n^2 - 2601 = 0$ $(n - 51)(n + 51) = 0$ $n = 51$ or / *of* $n = -51$ $\therefore n = 51$	✓ standard form / *standaardvorm* ✓ answer / *antwoord* (2)
		[6]

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QUESTION/*VRAAG 4*			
4.1	$q=-2$		✓ answer / *antwoord* (1)
4.2	$0=\frac{-2}{x+3}-2$ $2=\frac{-3}{x+3}$ $2x+6=-3$ $x=-4,5$		✓ $g(x)=0$ ✓ multiplying by $(x+3)$ *vermeningvuldig met* $(x+3)$ ✓ answer / *antwoord* (3)
4.3	$h(x)=x+3-2$ $=x+1$ **OR / *OF*** $h(x)=x+c$ $-2=-3+c$ $c=1$ $h(x)=x+1$		✓ method / *metode* ✓ answer / *antwoord* (2)
4.4	$y=-2+1=-1$ $-5=x+1$ $x=-6$ $\therefore C'(-6;-1)$		✓y-coordinate / *koördinaat* ✓ x-coordinate / *koördinaat* (2)
4.5	$p(x)=2^x$ $p^{-1}(x)=\log_2 x$		✓✓ equation of p *vergelyking van p* ✓ answer / *antwoord* (3)
4.6	4.6.1	$-4,5\le x<-3$ or/*of* $x\in[-4,5;-3)$	✓✓ answer / *antwoord* (2)
	4.6.2	$p:\quad y=2^x$ $p^{-1}:x=2^y$ $x=2$ $0<x<2$ or / *of* $x\in(0;2)$	✓ $x=2$ ✓ answer / *antwoord* (3)
			[15]

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QUESTION/*VRAAG 5*			
5.1	5.1.1	$x=\frac{1}{2}$	✓ answer / *antwoord* (1)
	5.1.2	$-6x+12=\frac{6}{x}$ $-6x^2+12x-6=0$ $x^2-2x+1=0$ $(x-1)(x-1)=0$ $x=1$ $y=-6+12=6$ or/*of* $y=\frac{6}{1}=6$ $A(1;6)$ $y=a(x+2)(x-3)$ $6=a(1+2)(1-3)$ $6=-6a$ $a=-1$ $f(x)=-(x+2)(x-3)$ $=-(x^2-3x+2x-6)$ $=-x^2+x+6$	✓ $\frac{6}{x}=-6x+12$ ✓ value of x / *waarde van x* ✓ coordinates of A or value of y *koördinate van* A *of waarde van y* ✓ $y=a(x+2)(x-3)$ ✓ value of a / *waarde van* a ✓ equation of f / *vergelyking van* f (6)
	5.1.3	$f\left(\frac{1}{2}\right)=-\left(\frac{1}{2}\right)^2+\frac{1}{2}+6$ $=6,25$	✓✓ answer / *antwoord* (2)
	5.1.4	$f(x)=-\left(x-\frac{1}{2}\right)^2+\frac{25}{4}$ $-\frac{1}{2}+m=-\frac{1}{4}$ $m=\frac{1}{4}$ $\frac{25}{4}+n=\frac{29}{4}$ $n=1$	✓ value of n / *waarde van* n ✓ value of m / *waarde van m* (2)
	5.1.5 (a)	$k>12$	✓✓ answer / *antwoord* (2)
	5.1.5 (b)	$k<\frac{25}{4}$	✓✓ answer / *antwoord* (2)

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5.2	$p(x)=ax^2+bx+c$ $p(-2)=a(-2)^2+b(-2)-4$ $-6=4a-2b-4$ $-2=4a-2b.....(1)$ $p(1)=a(1)^2+b(1)^2-4$ $0=a+b-4$ $4=a+b.....(2)$ $16=4a+4b.....(3)$ $(3)-(1):$ $18=6b$ $b=3$ $a=4-3$ $=1$ $p(x)=x^2+3x-4$ $p(10)=126$	✓ equation 1 / *vergelyking* 1 ✓ equation 2 / *vergelyking* 2 ✓ value of b / *waarde van b* ✓ value of a / *waarde van a* ✓ answer / *antwoord* (5)
		[20]
QUESTION/*VRAAG 6*		
6.1	$A=P(1+i)^n$ $85\ 000=P\left(1+\frac{12}{200}\right)^{32}$ $P=85\,000\left(1+\frac{12}{200}\right)^{-32}$ $P=13\,171{,}38$	✓ substitution / *vervanging* ✓ $n=32$ ✓ answer / *antwoord* (3)
6.2	$F_V=\frac{x\left[(1+i)^n-1\right]}{i}$ $=\frac{55\ 000\left[\left(1+\frac{6{,}75}{400}\right)^{16}-1\right]}{\frac{6{,}75}{400}}$ $=\text{R}1\ 000\ 646{,}90$ yes, R1 000 646,90 is greater than R1 million *ja*, R1 000 646,90 *is groter as R*1 *miljoen*	✓ $i=\frac{6{,}75\%}{4}$ and/*en* $n=16$ ✓ substitution / *vervanging* ✓ F_V ✓ conclusion / *gevolgtrekking* (4)

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6.3	6.3.1	$P_v = \dfrac{x\left[1-(1+i)^{-n}\right]}{i}$ $750\,000\left(1+\dfrac{11,5\%}{12}\right)^5 = \dfrac{x\left[1-\left(1+\dfrac{11,5\%}{12}\right)^{-235}\right]}{\dfrac{11,5\%}{12}}$ $\therefore\ x = \dfrac{750\,000\left(1+\dfrac{11,5\%}{12}\right)^5\left(\dfrac{11,5\%}{12}\right)}{\left[1-\left(1+\dfrac{11,5\%}{12}\right)^{-235}\right]}$ $= \text{R}8\,435,36$	✓ $n = -235$ ✓ $750\,000\left(1+\dfrac{11,5\%}{12}\right)^5$ ✓ substitution / *vervanging* ✓ answer / *antwoord* (4)
	6.3.2	$Total_1 = \text{R}\,8\,435,36 \times 235$ $= \text{R}1\,982\,309,60$ $Total_2 = \text{R}\,7\,998,22 \times 240$ $= \text{R}1\,919\,572,80$ Excess amount due to deferred payment : *Oortollige bedrag as gevolg van uitgestelde bedrag* : $= \text{R}1\,982\,309,22 - \text{R}1\,919\,572,80$ $= \text{R}\,62\,736,80$	✓ R1 982 309,60 & R1 919 572,60 ✓ answer / *antwoord* (2)
			[13]

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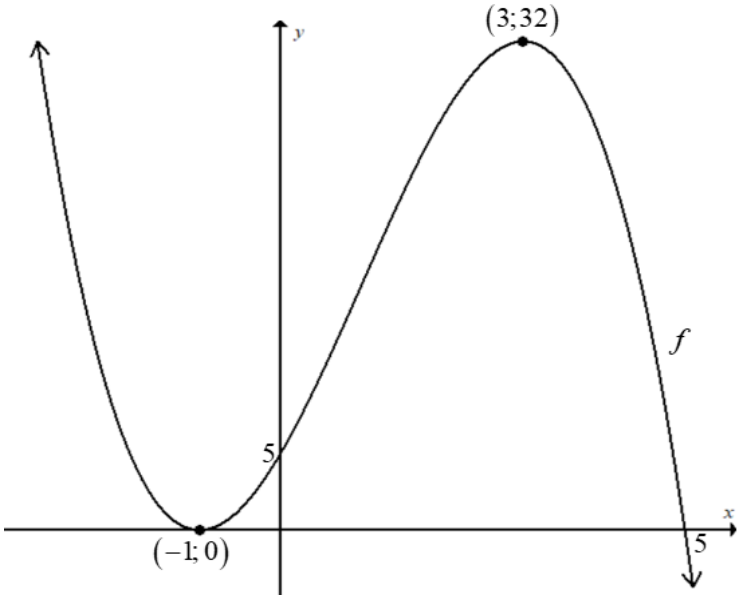
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QUESTION/*VRAAG 7*

7.1	7.1.1	$f'(x)=\lim\limits_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$ $=\lim\limits_{h\to 0}\dfrac{3(x+h)^2-1-(3x^2-1)}{h}$ $=\lim\limits_{h\to 0}\dfrac{3(x^2+2xh+h^2)-1-3x^2+1}{h}$ $=\lim\limits_{h\to 0}\dfrac{3x^2+6xh+3h^2-1-3x^2+1}{h}$ $=\lim\limits_{h\to 0}\dfrac{6xh+3h^2}{h}$ $=\lim\limits_{h\to 0}\dfrac{h(6x-3h)}{h}$ $=\lim\limits_{h\to 0}(6x-3h)$ $=6x$ Penalise 1 mark for incorrect notation in this question *Penaliseer 1 punt vir verkeerde notasie in hierdie vraag* Answer ONLY: 0 marks *SLEGS antwoord*: 0 *punte*	✓ $3x^2+6xh+3h^2$ ✓ simplification / *vereenvoudiging* ✓ factorisation / *faktorisering* (dividing by h / *deel deur* h) ✓ answer / *antwoord* (4)
	7.1.2	$m_t=f'(1)=6$ $y=6x+c$ $2=6(1)+c$ $c=-4$ $y=6x-4$	✓ $f'(1)=6$ ✓ substitution / *vervanging* ✓ answer / *antwoord* (3)
7.2	7.2.1	$\dfrac{d}{dx}(x^2+5x)$ $=2x+5$	✓ $2x$ ✓ 5 (2)
	7.2.2	$\dfrac{y}{(1-\sqrt{x})}=\dfrac{2}{x}$ $y=\dfrac{2(1-\sqrt{x})}{x}$ $=\dfrac{2-2\sqrt{x}}{x}$ $=\dfrac{2}{x}-\dfrac{2\sqrt{x}}{x}$ $=2x^{-1}-2x^{-\frac{1}{2}}$ $\therefore \dfrac{dy}{dx}=-2x^{-2}+x^{-\frac{3}{2}}$	✓ $\dfrac{2}{x}-\dfrac{2\sqrt{x}}{x}$ ✓ $2x^{-1}-2x^{-\frac{1}{2}}$ ✓ $-2x^{-2}$ ✓ $x^{-\frac{3}{2}}$ (4)
			[13]

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QUESTION 8/*VRAAG 8*			
8.1	8.1.1	$f(x) = -x^3 + 3x^2 + 9x + 5$ $x-\text{int}, y = 0:$ $(x+1)(x+1)(x-5) = 0$ $x = -1$ or/*of* $x = 5$ $(-1;0) \quad (5;0)$	✓ first factor / *eerste faktor* ✓ other factor / *ander faktor* ✓ x-intercepts / *x-afsnitte* (3)
	8.1.2	$f(x) = -x^3 + 3x^2 + 9x + 5$ $f'(x) = -3x^2 + 6x + 9$ $f'(x) = 0$ $-3x^2 + 6x + 9 = 0$ $x^2 - 2x - 3 = 0$ $(x-3)(x+1) = 0$ $x = 3$ or / *of* $x = -1$ $f(3) = 32$ $f(-1) = 0$ $(3;32) \quad (-1;0)$	✓ $f'(x)$ ✓ $f'(x) = 0$ ✓ $x-$values / $x-$*waardes* ✓ $y-$values / $y-$*waardes* (4)
	8.1.3		✓ shape / *vorm* ✓ intercepts / *afsnitte* ✓ turning points / *draaipunte* (3)
8.2	8.2.1	$3x^2 + 6x = 0$ $x(3x+6) = 0$ $x = 0$ *or* / *of* $x = -2$ $-2 < x < 0$ **OR / *OF*** $x \in (-2\ ;\ 0)$	✓ $x = -2$ ✓ answer / *antwoord* (2)

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	8.2.2	$x = \frac{-2+0}{2}$ $x = -1$ **OR / *OF*** $6x + 6 = 0$ $6x = -6$ $x = -1$	✓ method / *metode* ✓ answer / *antwoord* (2)
	8.2.3	$-2 \le x \le -1$ *or / of* $x \ge 0$	✓✓ $-2 \le x \le -1$ ✓ $x \ge 0$ (3)
			[17]

QUESTION/*VRAAG 9*

	$8x + 4h = 3$ $4h = 3 - 8x$ $h = \frac{3}{4} - 2x$ $V = x^2 h$ $= x^2\left(\frac{3}{4} - 2x\right)$ $= \frac{3}{4}x^2 - 2x^3$ $V'(x) = \frac{3}{2}x - 6x^2 = 0$ $x\left(\frac{3}{2} - 6x\right) = 0$ $x = 0$ *or / of* $-6x = -\frac{3}{2}$ $x = \frac{1}{4}$ $\therefore\ h = \frac{3}{4} - 2\left(\frac{1}{4}\right) = \frac{1}{4}$	✓ $8x + 4h = 3$ ✓ h in terms of x / *h in terme van x* ✓ substitution / *vervanging* ✓ answer / *antwoord* ✓ $V'(x) = 0$ ✓ x-values / *x-waardes* ✓ value of h / *waarde van h* (7)
		[7]

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QUESTION 10/*VRAAG 10*				
10.1	10.1.1	$\text{P(A and/}en\text{ B)} = \text{P(A)} + \text{P(B)} - \text{P(A or/}of\text{ B)}$ $= 0,3 + 0,5 - 0,65$ $= 0,15$	✓ substitution / *vervanging* ✓ answer / *antwoord*	(2)
	10.1.2	$\text{P(A and/}en\text{ B)} = 0,15$ $\text{P(A)} \times \text{P(B)} = 0,3 \times 0,5$ $= 0,15$ $\therefore \text{P(A and/}en\text{ B)} = \text{P(A)} \times \text{P(B)} = 0,15$ ∴ Events are independent / *Gebeurtenisse is onafhanklik*	✓✓ $P(A) \times P(B) = 0,15$ ✓ conclusion / *gevolgtrekking*	(3)
10.2	10.2.1	$a = 35$ and/*en* $b = 15$	✓ *a* ✓ *b*	(2)
	10.2.2	$\frac{11}{45}$ $\approx 0,24$	✓✓ answer / *antwoord*	(2)
				[9]
QUESTION/*VRAAG 11*				
11.1		$4! \times 8!$ ways / *maniere* = 967 680 ways / *maniere*	✓✓ answer / *antwoord*	(2)
11.2		$P(E) = \frac{4! \times 3!}{12!}$ $= \frac{1}{3326400}$	✓ 4! x 3! ✓ 12! ✓ answer / *antwoord*	(3)
				[5]
			TOTAL/*TOTAAL*:	**150**

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