education

Department of Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION
VOORBEREIDENDE EKSAMEN

GRADE/*GRAAD* 12

MATHEMATICS P1/*WISKUNDE* V1

SEPTEMBER 2020

MARKS/*PUNTE*: 150

MARKING GUIDELINES/*NASIENRIGLYNE*

These marking guidelines consists of 19 pages.
Hierdie nasienriglyne bestaan uit 19 bladsye.

NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate has crossed out an attempt to answer a question and did not redo it, mark the crossed-out version.
- Consistent accuracy applies in ALL aspects of the marking guidelines.
- Stop marking at the second mistake related to a mark.
- Assuming answers/values in order to solve a problem is NOT acceptable.

LET WEL:

- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n poging om 'n vraag te beantwoord, doodgetrek het en nie oorgedoen het nie, sien die doodgetrekte poging na.*
- *Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.*
- *Staak nasien by die tweede fout geassosieer met 'n punt.*
- *Die veronderstelling van antwoorde/waardes in probleemoplossing, word NIE toegelaat NIE.*

1	**QUESTION 1/*VRAAG 1***	
1.1		
1.1.1	$(x+5)(x-3)=-15$ $x^2+2x-15+15=0$ $x^2+2x=0$ $x(x+2)=0$ $x=0$ **OR/*OF*** $x=-2$	✓ standard form/ *standaardvorm* ✓ factors/ *faktore* ✓ BOTH answers/*BEIDE antwoorde* (3)
1.1.2	$3x^2-4x-11=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(-4)\pm\sqrt{(-4)^2-4(3)(-11)}}{2(3)}$ $x=\frac{4\pm\sqrt{148}}{6}$ $x=2{,}69$ **OR/*OF*** $x=-1{,}36$	✓ correct substitution into correct formula/*korrekte substitusie in korrekte formule* ✓ simplification/ *vereenvoudiging* ✓✓ answers/*antwoorde* **-1 for rounding only once/*-1 vir afronding slegs een maal*** (4)
1.1.3	$2x^2-3\geq 5x$ $2x^2-5x-3\geq 0$ $(2x+1)(x-3)\geq 0$ $x\leq -\frac{1}{2}$ **OR/*OF*** $x\geq 3$ **ALTERNATIVE/*ALTERNATIEWE*** $x\in(-\infty;-\frac{1}{2}]$ **OR/*OF*** $x\in[3;\infty)$	✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ ✓ answer/*antwoorde* **Last 2 marks combo/*Laaste 2-puntkombinasie*** **If AND max 2/4/*As EN maks 2/4*** **If; max 2/4/*As; maks 2/4*** **Wrong notation max 2/4/ *Verkeerde notasie maks 2/4*** (4)

1.1.4	$\sqrt{2x+1}+1+\dfrac{12}{\sqrt{2x+1}+3}=5$ Let $k=\sqrt{2x+1}$ then $k+1+\dfrac{12}{k+3}=5$ $k^2+4k+3+12=5k+15$ $k^2-k=0$ $k(k-1)=0$ $\sqrt{2x+1}=0$ **OR/*OF*** $\sqrt{2x+1}=1$ $2x+1=0$ **OR/*OF*** $2x+1=1$ $x=-\dfrac{1}{2}$ **OR/*OF*** $x=0$ Both answers applicable/*beide antwoorde korrek* **ALTERNATIVE/*ALTERNATIEWE*** $\sqrt{2x+1}+1+\dfrac{12}{\sqrt{2x+1}+3}=5$ $2x+1+3\sqrt{2x+1}+\sqrt{2x+1}+3+12=5\sqrt{2x+1}+15$ $2x+1=\sqrt{2x+1}$ $4x^2+4x+1=2x+1$ $4x^2+2x=0$ $2x(2x+1)=0$ $x=-\dfrac{1}{2}$ **OR/*OF*** $x=0$	✓ $k=\sqrt{2x+1}$ ✓ x LCM/x KGV ✓ standard form/*standaardvorm* ✓ factors or formula/*faktore of formule* ✓ answers WITH CHOICE/*antwoorde MET KEUSE* (5) ✓ x LCM/x KGV ✓ squaring both sides/*kwadreer weerskante* ✓ standard form/*standaardvorm* ✓ factors or formula/*faktore of formule* ✓ answers WITH CHOICE/*antwoorde MET KEUSE*

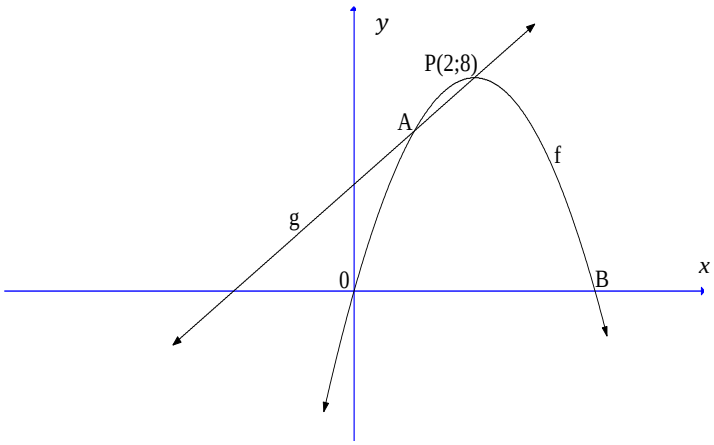
1.1.5	$\sqrt[3]{x^2}-4\sqrt[3]{x}-5=0$ $x^{\frac{2}{3}}-4x^{\frac{1}{3}}-5=0$ $\left(x^{\frac{1}{3}}-5\right)\left(x^{\frac{1}{3}}+1\right)=0$ $x^{\frac{1}{3}}=5$ **OR/*OF*** $x^{\frac{1}{3}}=-1$ $x=125$ **OR/*OF*** $x=-1$	✓ simplify/*vereenvoudig* ✓ factors/*faktore* ✓ equations/*vergelykings* ✓ both answers/*beide antwoorde* (4)
1.2	$2x^3-3x^2-17x-12=(x+1)(x-4)(2x+3)$ given $\therefore 2(y-2)^3-3(y-2)^2+17(2-y)=12$ Let $k=y-2$ $\therefore 2k^3-3k^2-17k-12=0$ $(k+1)(k-4)(2k+3)=0$ $k=-1$ **OR/*OF*** $k=4$ **OR/*OF*** $2k=-3$ $\therefore y-2=-1$ **OR/*OF*** $y-2=4$ **OR/*OF*** $2y-4=-3$ $y=1; y=6; y=\frac{1}{2}$ **ALTERNATIVE/*ALTERNATIEWE*** $(y-2+1)(y-2-4)(2(y-2)+3)=0$ $y=1; y=6; y=\frac{1}{2}$ **ALTERNATIVE/*ALTERNATIEWE*** $2y^3-15y^2+19y-6=0$ $(y-1)(y-6)(2y-1)=0$ $y=1; y=6; y=\frac{1}{2}$	✓ method/*metode* ✓ 1 ✓ 6 ✓ $\frac{1}{2}$ (4) Using factor and remainder theorem/ *Gebruik res- en faktorstelling*
		[24]

	QUESTION 2/*VRAAG 2*	
2.1	Quadratic sequence/*Kwadratiese ry* $1; x; 1; -2; y; \ldots; -322$	
2.1.1	$1 \quad x \quad 1 \quad -2 \quad y$ $x-1; 1-x; -3; y+2$ 1^{st} diff $-2x+2; x-4; y+5$ ^{2nd} diff $\therefore -2x+2 = x-4$ $3x = 6$ $x = 2$ **AND/*EN*** $x-4 = y+5$ $\therefore 2-4 = y+5$ $y = -7$	✓ 1^{st} difference/1*e verskille* ✓ 2^{nd} difference equal/ 2*e verskille gelyk* ✓ value of x/*waarde van x* ✓ value of y/*waarde van y* (4)
2.1.2	Hence quadratic sequence/*Vervolgens* $1; 2; 1; -2; -7; \ldots$ $1; -1; -3; -5$ first difference $-2; -2; -2$ second difference $2a = -2 \quad 3a+b = 1 \quad a+b+c = 1$ $a = -1 \quad b = 4 \quad c = -2$ $\therefore -n^2+4n-2 = -322$ $n^2-4n-320 = 0$ $(n-20)(n+16) = 0$ or formula/*of formule* $n = 20$ **OR/*OF*** $n = -16$ $\therefore$ 20 terms/20 *terme*	✓ value of a/*waarde van a* ✓ value of b/*waarde van b* ✓ value of c/*waarde van c* ✓ $T_n = -322$ ✓ answer/*antwoord* (5)

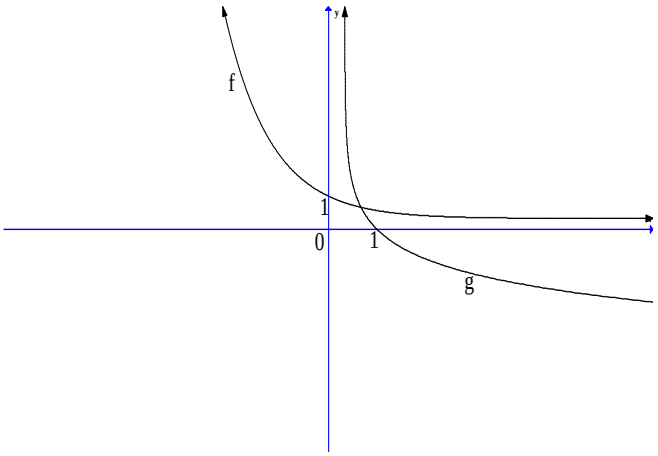
2.2	$S_n = 5n - 3$ $\therefore T_{34} = S_{34} - S_{33}$ $= 5(34) - 3 - [5(33) - 3]$ $= 5$	✓ formula/*formule* ✓ substitution/*substitusie* ✓ answer/*antwoord* (3)
2.3	$a + 9d = 28$ equation 1/ *vergelyking* 1 $a + 4d + a + 6d = 32$ $2a + 10d = 32$ $a + 5d = 16$ equation 2/ *vergelyking 2* equation 1 − equation 2: $4d = 12$ $d = 3 \quad \therefore a = 1$ $S_{50} = \frac{50}{2}[2(1) + (50 - 1)3]$ $= 3725$	✓ formula T_{10}/*formule* T_n ✓ formula $T_5 + T_7$/*formule* $T_5 + T_7$ ✓ BOTH a and d/*BEIDE a en d* ✓ correct substitution in correct formula/*korrekte substitusie in korrekte formule* ✓ answer/*antwoord* (5)
		[17]
	QUESTION 3/*VRAAG 3*	
3.1	$S_n = a + ar + ar^2 + ... + ar^{n-1}$ $rS_n = ar + ar^2 + ... + ar^{n-1} + ar^n$ $\therefore S_n - rS_n = a - ar^n$ $S_n(1 - r) = a(1 - r^n)$ $S_n = \frac{a(1 - r^n)}{1 - r}$	✓ expand S_n/*brei uit* ✓ expand rS_n/*brei uit* ✓ subtract/*trek af* ✓ common factor/*gemene faktor* (4)

3.2	Geometric sequence/*Meetkundige ry* $\sqrt{3}\,;\ \sqrt{3}-1;\ ...$ $r=\dfrac{\sqrt{3}-1}{\sqrt{3}}=\dfrac{\sqrt{3}\left(\sqrt{3}-1\right)}{\sqrt{3}\sqrt{3}}=\dfrac{3-\sqrt{3}}{3}$ $a=\sqrt{3}$ $S_\infty=\dfrac{a}{1-r}$ $S_\infty=\dfrac{\sqrt{3}}{1-\dfrac{3-\sqrt{3}}{3}}=\dfrac{\sqrt{3}}{\dfrac{3-\left(3-\sqrt{3}\right)}{3}}=\sqrt{3}\times\dfrac{3}{\sqrt{3}}$ $=3$ **ALTERNATIVE/*ALTERNATIEWE*** $a=\sqrt{3}$ **AND/*EN*** $r=\dfrac{\sqrt{3}-1}{\sqrt{3}}$ $S_\infty=\dfrac{\sqrt{3}}{1-\dfrac{\sqrt{3}-1}{\sqrt{3}}}=\dfrac{\sqrt{3}}{\dfrac{\sqrt{3}-\left(\sqrt{3}-1\right)}{\sqrt{3}}}=\sqrt{3}\times\sqrt{3}$ $=3$	✓ value of *r*/*waarde van r* ✓ correct substitution in correct formula/*korrekte substitusie in korrekte formule* ✓ simplify denominator/*vereenvoudig noemer* ✓ answer/*antwoord* (4) **If the steps from substitution to answer are not shown clearly, award max 2/4/*As al die stappe vanaf substitusie tot by finale antwoord nie duidelik gewys word nie, gee maksimum 2/4***

3.3	Geometric sequence/*Meetkundige ry* $T_3 + T_4 + T_5 = 28$ $\therefore ar^2 + ar^3 + ar^4 = 28$ $ar^2\left(1 + r + r^2\right) = 28$ $T_6 + T_7 + T_8 = 224$ $\therefore ar^5 + ar^6 + ar^7 = 224$ $ar^5\left(1 + r + r^2\right) = 224$ Then $\frac{ar^5\left(1 + r + r^2\right)}{ar^2\left(1 + r + r^2\right)} = \frac{224}{28}$ $\therefore r^3 = 8$ $r = 2 \qquad \therefore a = 1$ First three terms/*Eerst drie terme* : $1; 2; 4$	✓ formula for sum of the 3 terms/*formule vir die som van 3 terme* ✓ factors/*faktore* ✓ ratio/*verhouding* ✓ BOTH r and a/*BEIDE r en a* ✓ first THREE terms/*eerste DRIE terme* (5)
		[13]

	QUESTION 4/*VRAAG 4*	
4.1		
4.1.1	Substitute/*Vervang* $P(2;8)$ $y = a(x-2)^2 + 8$ Substitute/*vervang* $(0;0)$ $0 = a(0-2)^2 + 8$ $a = -2$ $\therefore y = -2(x-2)^2 + 8$ $= -2(x^2 - 4x + 4) + 8 = -2x^2 + 8x$ **ALTERNATIVE/*ALTERNATIEWE*** $y = a(x-0)(x-4)$ Substitute/*vervang* $(2;8)$ $8 = a(2-0)(2-4)$ $a = -2$ $\therefore y = -2x(x-4) = -2x^2 + 8x$	✓ substitute/*vervang* P ✓ substitute/*vervang* (0; 0) ✓ value of *a*/ *waarde van a* ✓ simplify/*vereenvoudig* (4) ✓ x-intercepts/*x-afsnitte* ✓ substitute P/*vervang P* ✓ value of *a*/*waarde van a* ✓ simplify/*vereenvoudig* (4)

4.1.2	$B(4;0)$ $2x+4=-2x^2+8x$ $x^2-3x+2=0$ $(x-1)(x-2)=0$ $\therefore A(1;6)$	✓ coordinates B/ *koördinate B* ✓ equating/*stel gelyk* ✓ coordinates A/ *koördinate A* (3)
4.1.3	$f'(x).g(x)\leq 0$ $\therefore x\in(-\infty;-2]\cup x\in[2;\infty)$ **OR/*OF*** $y\leq -2$ or/of $y\geq 2$	✓ values/*waardes* ✓ notation/*notasie* (2)
4.1.4	Turning point $(1;7)$/*Draaipunt* $(1;7)$ $y\leq 7$ **OR/*OF*** $y\in(-\infty;7]$	✓ $(1;7)$ ✓ answer/*antwoord* **Answer only/*slegs antwoord* 2/2** (2)
4.1.5	$f'(x)=-4x+8$ $\therefore -4x+8=2$ $x=\frac{3}{2}$	✓ derivative/*afgeleide* ✓ 2 ✓ answer/*antwoord* (3)
4.2		
4.2.1	$x=2$ **AND/*EN*** $y=1$	✓✓ (2)
4.2.2	$m=-1$ **AND/*EN*** $(3;1)$ $y-1=-1(x-3)$ **OR/*OF*** $1=-1(3)+c$ $y=-x+4$ $c=4$ $\therefore y=-x+4$	✓ $m=-1$ ✓ substitute $(3;1)$ ✓ answer/*antwoord* (3)
		[19]

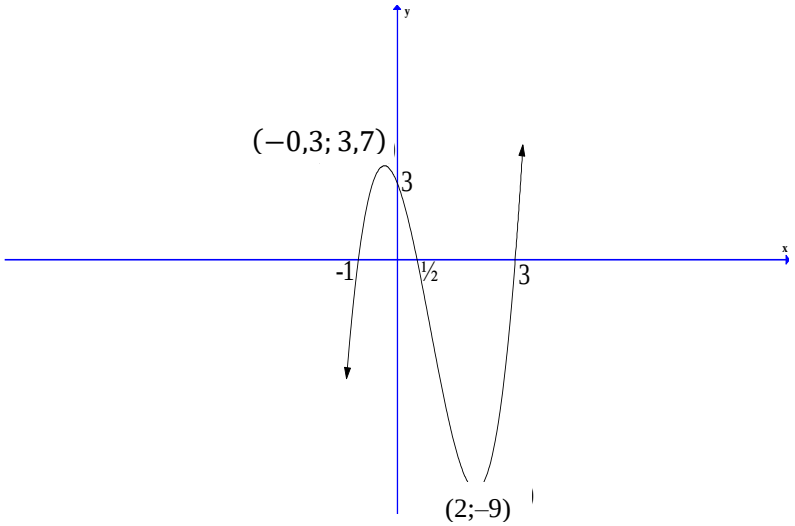
	QUESTION 5/*VRAAG 5*	
5.1	$f(x)=2^{-x}$ $\therefore g: x=2^{-y}$ $-y=\log_2 x$ $y=-\log_2 x$ **OR/*OF*** $y=\log_2 x^{-1}$ **OR/*OF*** $y=\log_{\frac{1}{2}} x$	✓ interchange x and y/*ruil x en y om* ✓ answer/*antwoord* (2) **Answer only full marks/*slegs antwoord volpunte***
5.2	Yes, x values do not repeat/Ja, x waardes herhaal nie **OR/*OF*** Yes, every x value has unique y value/Ja, elke $x$waarde het 'n unieke y waarde	✓ yes/*ja* ✓ valid reason/ *geldige rede* (2)
5.3		f : ✓ shape/*vorm* ✓ intercept/*afsnit* g : ✓ shape/*vorm* ✓ intercept/*afsnit* (4)
5.4	$h(x)=2^{-x+1}-2$ $=2^{-x}.2-2$ $=2\left(\frac{1}{2}\right)^x-2$ **OR/*OF*** $y=\frac{2}{2^x}-2$	✓ correct translation indicated/*korrekte translasie aangedui* ✓ answer with POSITIVE exponent/*antwoord met positiewe eksponent* (2)
		[10]

	QUESTION 6/*VRAAG 6*	
6.1	$A = P(1-i)^n$ $\frac{3}{4}x = x(1-0{,}082)^n$ $\frac{3}{4} = (0{,}918)^n$ $\therefore n = \log_{0{,}918} 0{,}75$ $n = 3{,}36$ $\therefore$ 4 years/*jaar*	✓ values of A and P/*waardes van A en P* ✓ correct substitution in correct formula/*korrekte substitusie in korrekte formule* ✓ correct use of logs/*korrekte gebruik van logs* ✓ answer in years/*antwoord in jare* (4)
6.2	$F_v = \frac{x\left[(1+i)^n - 1\right]}{i}$ $58480 = \frac{x\left[\left(1+\frac{0{,}09}{12}\right)^{71} - 1\right]}{\frac{0{,}09}{12}}\left(1+\frac{0{,}09}{12}\right)^2$ $\therefore x = \text{R}\,617{,}45$	✓ $\frac{0{,}09}{12}$ ✓ 71 ✓ correct substitution/*korrekte substitusie* ✓ $\left(1+\frac{0.09}{12}\right)^2$ ✓ answer (5)

6.3		
6.3.1	$\left(1+\frac{0{,}08}{4}\right)^4=\left(1+\frac{i}{12}\right)^{12}$ $\left(\sqrt[12]{1{,}08243216}-1\right)\times 12=i$ $i=0{,}0794725..$ $\therefore$ 7,95% compounded monthly $P_v=\frac{x\left[1-(1+i)^{-n}\right]}{i}$ $1500000=\frac{x\left[1-\left(1+\frac{0{,}0795}{12}\right)^{-240}\right]}{\frac{0{,}0795}{12}}$ $\therefore x=\text{R}1249{,}96$	✓ correct substitution in correct formula/*korrekte substitusie in korrekte formule* ✓ 7,95% ✓ -240 ✓ $\frac{0{,}0795}{12}$ ✓ correct substitution into correct formula/*korrekte substitusie in korrekte formule* (5)
6.3.2	Outstanding balance/*Uitstaande balans* $=\frac{12499{,}96\left[1-\left(1+\frac{0{,}0795}{12}\right)^{-96}\right]}{\frac{0{,}0795}{12}}$ $=$ R 885813,38 **ALTERNATIVE/*ALTERNATIEWE*** Outstanding balance/*Uitstaande balans* $=1500000\left(1+\frac{0{,}0795}{12}\right)^{144}-\frac{12499{,}96\left[\left(1+\frac{0{,}0795}{12}\right)^{144}-1\right]}{\frac{0{,}0795}{12}}$ $=$ R 885814,82	IF using P_v method/*Indien $P_v$metode* ✓ -96 ✓ correct substitution/*korrekte substitusie* ✓ answer/*antwoord* **OR/*OF*** ✓ 144 ✓ correct substitution/*korrekte substitusie* ✓ answer/*antwoord* (3)
		[17]

QUESTION 7/*VRAAG 7*		
	-1 for notation only ONCE in this question ***-1 vir notasie slegs EEN keer in hierdie vraag***	
7.1	$f(x)=-x^2-2$ $f(x+h)=-(x+h)^2-2$ $=-x^2-2xh-h^2-2$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $=\lim_{h\to 0}\frac{-x^2-2xh-h^2-2-\left(-x^2-2\right)}{h}$ $=\lim_{h\to 0}\frac{-2xh-h^2}{h}$ $=\lim_{h\to 0}\frac{h(-2x-h)}{h}$ $=-2x$	✓ $f(x+h)$ ✓ formula/*formule* ✓ correct substitution/*korrekte substitusie* ✓ factors/*faktore* ✓ answer/*antwoord* (5)
7.2		
7.2.1	$y=\frac{x}{3}+\sqrt[4]{x^3}-5p^2$ $y=\frac{1}{3}x+x^{\frac{3}{4}}-5p^2$ $\therefore \frac{dy}{dx}=\frac{1}{3}+\frac{3}{4}x^{\frac{-1}{4}}$	✓ $x^{\frac{3}{4}}$ ✓ $\frac{1}{3}$ ✓ $\frac{3}{4}x^{-\frac{1}{4}}$ (3) **-1 if -10p included/*-1 as -10p ingesluit***
7.2.2	$D_x\left[\left(2x^{-1}-\sqrt{5}\right)^2\right]$ $=D_x\left[4x^{-2}-4\sqrt{5}x^{-1}+5\right]$ $=-8x^{-3}+4\sqrt{5}x^{-2}$	✓ expand/*brei uit* ✓ $-8x^{-3}$ ✓ $4\sqrt{5}x^{-2}$ (3)
		[11]

	QUESTION 8/*VRAAG 8*	
8.1	$y = 2x^3 + ax^2 + bx + 3$ Substitute $(2;-9)$/*Vervang* $(2;-9)$ $-9 = 2(2)^3 + a(2)^2 + 2b + 3$ $-9 = 16 + 4a + 2b + 3$ $-28 = 4a + 2b$ $2a + b = -14$ equation 1/*vergelyking* 1 $f'(x) = 6x^2 + 2ax + b$ $\therefore 0 = 6(2)^2 + 2a(2) + b$ $4a + b = -24$ equation 2/*vergelyking* 2 Equation 2 – equation 1/*vergelyking 2 – vergelyking 1* $2a = -10$ $a = -5$ $\therefore b = -24 - 4(-5) = -4$ **ALTERNATIVE/*ALTERNATIEWE*** From equation 1/*Uit vergelyking* 1: $b = -14 - 2a$ Substitute in equation 2/*Vervang in vergelyking* 2: $-24 = 4a - 14 - 2a$ $2a = -10$ $a = -5$ $\therefore b = -24 - 4(-5) = -4$	✓ substitute/*vervang* (2; –9) ✓ equation 1/*vergelyking* 1 ✓ derivative/*afgeleide* ✓ $x = 2$ ✓ = 0 ✓ BOTH values correct/*BEIDE waardes korrek* (6)
8.2	$f(x) = 2x^3 - 5x^2 - 4x + 3$ $f(-1) = 2(-1)^3 - 5(-1)^2 - 4(-1) + 3 = -2 - 5 + 4 + 3 = 0$ $\therefore (x + 1)$ is a factor/*is 'n faktor*	✓ $x = -1$ ✓ = 0 (2)

8.3	$f(x)=(x+1)(2x^2-7x+3)$ $=(x+1)(2x-1)(x-3)$ $\therefore x=-1; x=3; x=\frac{1}{2}$ $f'(x)=6x^2-10x-4$ $0=3x\ -5x-2$ $(3x+1)(x-2)=0$ $\therefore (2;-9)$ **AND/*EN*** $\left(-\frac{1}{3};\frac{100}{27}\right)$ turning points/*draaipunte*  	$y=3$ $x=-1$ ✓✓ $x=3$ $x=\frac{1}{2}$ ✓shape/*vorm* ✓ $\left(-\frac{1}{3};3\frac{19}{27}\right)$ ✓ (2;–9) (5)
8.4	$f''(x)=12x-10$ $0=6x-5$ $x=\frac{5}{6}$ Graph concave down when/*grafiek konkaaf na onder as* $x<\frac{5}{6}$ **OR/*OF*** $x\in\left(-\infty;\frac{5}{6}\right)$	✓ $12x-10=0$ ✓ answer/*antwoord* (2)
		[15]

	QUESTION 9/*VRAAG 9*	
9.1	$V = l \times b \times h$ $1000cm^3 = 2xcm \times xcm \times hcm$ $\therefore h = \frac{1000}{2x^2} = \frac{500}{x^2}$	✓ formula volume/*formule volume* ✓ substitution/ *substitusie* (2)
9.2	$SA = 2\left(x \times \frac{500}{x^2}\right) + 2\left(2x \times \frac{500}{x^2}\right) + 2(x \times 2x)$ $= \frac{1000}{x} + \frac{2000}{x} + 4x^2$ $= 3000x^{-1} + 4x^2$ $\therefore \frac{dA}{dx} = -3000x^{-2} + 8x$ $8x^3 = 3000$ $x^3 = 375$ $x = 7{,}21$ $\therefore l = 14{,}42cm; b = 7{,}21cm; h = 9{,}62cm$	✓ substitution/ *substitusie* ✓ answer/*antwoord* ✓ derivative = 0/*afgeleide =0* ✓ value of *x*/*waarde van x* (4)
		[6]

	QUESTION 10/*VRAAG 10*	
10.1	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ Let $P(B) = x$ $0{,}4 = 3x + x - 3x^2$ $3x^2 - 4x + 0{,}4 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{4 \pm \sqrt{(-4)^2 - 4(3)(0{,}4)}}{2(3)}$ $x = \frac{4 \pm \sqrt{11{,}2}}{6}$ $x = 1{,}22 n.a$ $x = 0{,}11$ $\therefore P(B) = 0{,}11$	✓ P(A and B) = P(A) x P(B) ✓ standard form/*standaardvorm* ✓ correct substitution/*korrekte substitusie* ✓ Answers with choice/*antwoorde met keuse* (4)

10.2	P(club and sleeps late) $= 0,6 \times 0,7 = 0,42$ P(cinema and sleeps late) $0,4 \times 0,4 = 0,16$ $\therefore$ P(sleeps late) $= 0,42 + 0,16 = 0,58$	✓ 0,42 ✓ 0,16 ✓ 0,58 (3)
		[7]

	QUESTION 11/*VRAAG 11*	
11.1		
11.1.1	$5! = 120$	✓ 5! ✓ 120 (2)
11.1.2	$\frac{3! \times 2}{5!} = \frac{1}{10}$	✓ numerator /*teller* ✓ denominator/ *noemer* (2)
11.2		
11.2.1	$3 \times 7 \times 7 \times 3 = 441$	✓ 3 ✓ 7×7 ✓ 3 (3)
11.2.2	$\frac{3 \times 5 \times 4 \times 1}{7 \times 6 \times 5 \times 4} = \frac{1}{14}$	✓3 ✓ 5×4 ✓ 1 ✓ denominator/ *noemer* (4)
		[11]
		TOTAL/*TOTAAL*: 150