



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.*
- *Stak 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/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓ BOTH answers/ <i>BEIDE</i> <i>antwoorde</i> (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/ <i>korrekte</i> <i>substitusie in korrekte</i> <i>formule</i> ✓ simplification/ <i>vereenvoudiging</i> ✓✓ answers/ <i>antwoorde</i> -1 for rounding only once/-1 <i>vir afronding slegs een maal</i> (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/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓✓ answer/ <i>antwoorde</i> 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)

<p>1.1.4</p> $\sqrt{2x+1}+1+\frac{12}{\sqrt{2x+1}+3}=5$ <p>Let $k = \sqrt{2x+1}$ then</p> $k+1+\frac{12}{k+3}=5$ $k^2+4k+3+12=5k+15$ $k^2-k=0$ $k(k-1)=0$ $\sqrt{2x+1}=0 \text{ OR/OF } \sqrt{2x+1}=1$ $2x+1=0 \text{ OR/OF } 2x+1=1$ $x=-\frac{1}{2} \text{ OR/OF } x=0$ <p>Both answers applicable/beide antwoorde korrek</p> <p>ALTERNATIVE/ALTERNATIEWE</p> $\sqrt{2x+1}+1+\frac{12}{\sqrt{2x+1}+3}=5$ $2x+1+3\sqrt{2x+1}+\sqrt{2x+1}+3+12=5\sqrt{2x+1}+15$ $2x+1=\sqrt{2x+1}$ $4x^2+4x+1=2x+1$ $4x^2+2x=0$ $2x(2x+1)=0$ $x=-\frac{1}{2} \text{ OR/OF } x=0$	<p>✓ $k = \sqrt{2x+1}$</p> <p>✓ x LCM/x KGV</p> <p>✓ standard form/standaardvorm</p> <p>✓ factors or formula/faktore of formule</p> <p>✓ answers WITH CHOICE/antwoorde MET KEUSE</p> <p>(5)</p> <p>✓ x LCM/x KGV</p> <p>✓ squaring both sides/kwadreeer weerskante</p> <p>✓ standard form/standaardvorm</p> <p>✓ factors or formula/faktore of formule</p> <p>✓ answers WITH CHOICE/antwoorde MET KEUSE</p>
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1.1.5	$\sqrt[3]{x^2} - 4\sqrt[3]{x} - 5 = 0$ $x^{\frac{2}{3}} - 4x^{\frac{1}{3}} - 5 = 0$ $\left(x^{\frac{1}{3}} - 5\right)\left(x^{\frac{1}{3}} + 1\right) = 0$ $x^{\frac{1}{3}} = 5 \text{ OR/OF } x^{\frac{1}{3}} = -1$ $x = 125 \text{ OR/OF } x = -1$	<p>✓ simplify/vereenvoudig</p> <p>✓ factors/faktore</p> <p>✓ equations/vergelijkinge</p> <p>✓ both answers/beide antwoorde</p> <p style="text-align: right;">(4)</p>
1.2	$2x^3 - 3x^2 - 17x - 12 = (x+1)(x-4)(2x+3) \text{ given}$ $\therefore 2(y-2)^3 - 3(y-2)^2 + 17(2-y) = 12$ <p>Let $k = y - 2$</p> $\therefore 2k^3 - 3k^2 - 17k - 12 = 0$ $(k+1)(k-4)(2k+3) = 0$ $k = -1 \text{ OR/OF } k = 4 \text{ OR/OF } 2k = -3$ $\therefore y - 2 = -1 \text{ OR/OF } y - 2 = 4 \text{ OR/OF}$ $2y - 4 = -3$ $y = 1; y = 6; y = \frac{1}{2}$ <p>ALTERNATIVE/ALTERNATIEWE</p> $(y-2+1)(y-2-4)(2(y-2)+3) = 0$ $y = 1; y = 6; y = \frac{1}{2}$ <p>ALTERNATIVE/ALTERNATIEWE</p> $2y^3 - 15y^2 + 19y - 6 = 0$ $(y-1)(y-6)(2y-1) = 0$ $y = 1; y = 6; y = \frac{1}{2}$	<p>✓ method/metode</p> <p>✓ 1</p> <p>✓ 6</p> <p>✓ $\frac{1}{2}$</p> <p style="text-align: right;">(4)</p> <p>Using factor and remainder theorem/ Gebruik res- en faktorstelling</p>
		[24]

	QUESTION 2/VRAAG 2	
2.1	Quadratic sequence/ <i>Kwadratiese ry</i> $1; x; 1; -2; y; \dots; -322$	
2.1.1	$1 \quad x \quad 1 \quad -2 \quad y$ $x - 1; 1 - x; -3; y + 2$ 1 st diff $-2x + 2; x - 4; y + 5$ 2 nd 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/ <i>1e verskille</i> ✓ 2 nd difference equal/ <i>2e verskille gelyk</i> ✓ value of x / <i>waarde van x</i> ✓ value of y / <i>waarde van y</i> (4)
2.1.2	Hence quadratic sequence/ <i>Vervolgens</i> $1; 2; 1; -2; -7; \dots$ $1; -1; -3; -5$ 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/ <i>of formule</i> $n = 20$ OR/OF $n = -16$ $\therefore 20$ terms/ <i>20 terme</i>	✓ value of a / <i>waarde van a</i> ✓ value of b / <i>waarde van b</i> ✓ value of c / <i>waarde van c</i> ✓ $T_n = -322$ ✓ answer/ <i>antwoord</i> (5)

2.2	$S_n = 5n - 3$ $\therefore T_{34} = S_{34} - S_{33}$ $= 5(34) - 3 - [5(33) - 3]$ $= 5$	<ul style="list-style-type: none"> ✓ formula/formule ✓ substitution/substitusie ✓ answer/antwoord <p>(3)</p>
2.3	$a + 9d = 28 \text{ equation 1/ vergelyking 1}$ $a + 4d + a + 6d = 32$ $2a + 10d = 32$ $a + 5d = 16 \quad \text{equation 2/ vergelyking 2}$ $\text{equation 1} - \text{equation 2: } 4d = 12$ $d = 3 \quad \therefore a = 1$ $S_{50} = \frac{50}{2} [2(1) + (50-1)3]$ $= 3725$	<ul style="list-style-type: none"> ✓ 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 <p>(5)</p>
		[17]
QUESTION 3/VRAAG 3		
3.1	$S_n = a + ar + ar^2 + \dots + ar^{n-1}$ $rS_n = ar + ar^2 + \dots + ar^{n-1} + ar^n$ $\therefore S_n - rS_n = a - ar^n$ $S_n(1-r) = a(1-r^n)$ $S_n = \frac{a(1-r^n)}{1-r}$	<ul style="list-style-type: none"> ✓ expand S_n/brei uit ✓ expand rS_n/brei uit ✓ subtract/trek af ✓ common factor/gemene faktor <p>(4)</p>

3.2	<p>Geometric sequence/<i>Meetkundige ry</i></p> <p>$\sqrt{3}; \sqrt{3} - 1; \dots$</p> $r = \frac{\sqrt{3}-1}{\sqrt{3}} = \frac{\sqrt{3}(\sqrt{3}-1)}{\sqrt{3}\sqrt{3}} = \frac{3-\sqrt{3}}{3}$ <p>$a = \sqrt{3}$</p> $S_{\infty} = \frac{a}{1-r}$ $S_{\infty} = \frac{\sqrt{3}}{1 - \frac{3-\sqrt{3}}{3}} = \frac{\sqrt{3}}{\frac{3-(3-\sqrt{3})}{3}} = \sqrt{3} \times \frac{3}{\sqrt{3}}$ <p style="text-align: center;">$= 3$</p> <p>ALTERNATIVE/ALTERNATIEWE</p> <p>$a = \sqrt{3}$ AND/EN $r = \frac{\sqrt{3}-1}{\sqrt{3}}$</p> $S_{\infty} = \frac{\sqrt{3}}{1 - \frac{\sqrt{3}-1}{\sqrt{3}}} = \frac{\sqrt{3}}{\frac{\sqrt{3} - (\sqrt{3}-1)}{\sqrt{3}}} = \sqrt{3} \times \sqrt{3}$ <p style="text-align: center;">$= 3$</p>	<p>✓ value of r/<i>waarde van r</i></p> <p>✓ correct substitution in correct formula/<i>korrekte substitusie in korrekte formule</i></p> <p>✓ simplify denominator/<i>vereenvoudig noemer</i></p> <p>✓ answer/<i>antwoord</i></p> <p style="text-align: right;">(4)</p> <p>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</p>
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3.3	<p>Geometric sequence/<i>Meetkundige ry</i></p> $T_3 + T_4 + T_5 = 28$ $\therefore ar^2 + ar^3 + ar^4 = 28$ $ar^2(1 + r + r^2) = 28$ $T_6 + T_7 + T_8 = 224$ $\therefore ar^5 + ar^6 + ar^7 = 224$ $ar^5(1 + r + r^2) = 224$ <p>Then $\frac{ar^5(1 + r + r^2)}{ar^2(1 + r + r^2)} = \frac{224}{28}$</p> $\therefore r^3 = 8$ $r = 2 \quad \therefore a = 1$ <p>First three terms/<i>Eerst drie terme</i> : 1; 2; 4</p>	<p>✓ formula for sum of the 3 terms/<i>formule vir die som van 3 terme</i></p> <p>✓ factors/<i>faktore</i></p> <p>✓ ratio/<i>verhouding</i></p> <p>✓ BOTH <i>r</i> and <i>a</i>/<i>BEIDE r en a</i></p> <p>✓ first THREE terms/<i>eerste DRIE terme</i></p> <p style="text-align: right;">(5)</p>
		[13]

QUESTION 4/VRAAG 4		
4.1		
4.1.1	<p>Substitute/Vervang P(2; 8)</p> $y = a(x - 2)^2 + 8$ <p>Substitute/vervang (0; 0)</p> $0 = a(0 - 2)^2 + 8$ $a = -2$ $\therefore y = -2(x - 2)^2 + 8$ $= -2(x^2 - 4x + 4) + 8 = -2x^2 + 8x$ <p>ALTERNATIVE/ALTERNATIEWE</p> $y = a(x - 0)(x - 4)$ <p>Substitute/vervang (2; 8)</p> $8 = a(2 - 0)(2 - 4)$ $a = -2$ $\therefore y = -2x(x - 4) = -2x^2 + 8x$	<p>✓ substitute/vervang P</p> <p>✓ substitute/vervang (0; 0)</p> <p>✓ value of a/ waarde van a</p> <p>✓ simplify/vereenvoudig</p> <p style="text-align: right;">(4)</p> <p>✓ x-intercepts/x-afsnitte</p> <p>✓ substitute P/vervang P</p> <p>✓ value of a/waarde van a</p> <p>✓ simplify/vereenvoudig</p> <p style="text-align: right;">(4)</p>

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/ <i>koördinate B</i> ✓ equating/stel gelyk ✓ coordinates A/ <i>koördinate A</i> (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)/ <i>Draaipunt (1; 7)</i> $y \leq 7$ 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]

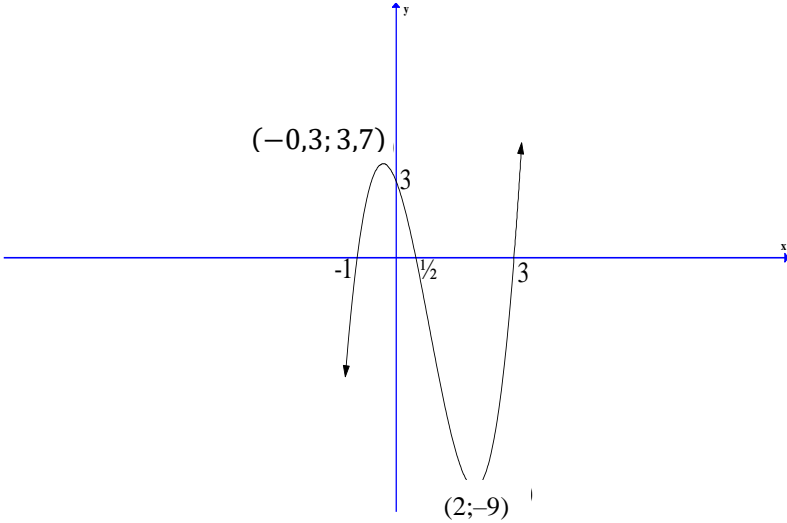
QUESTION 5/VRAAG 5		
5.1	$f(x) = 2^{-x}$ $\therefore g : x = 2^{-y}$ $-y = \log_2 x$ $y = -\log_2 x$ OR/OF $y = \log_2 x^{-1}$ OR/OF $y = \log_{\frac{1}{2}} x$	✓ interchange x and y /ruil x en y om ✓ answer/antwoord (2) Answer only full marks/slegs antwoord volpunte
5.2	Yes, x values do not repeat/Ja, x waardes herhaal nie <p style="text-align: center;">OR/OF</p> 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	$h(x) = 2^{-x+1} - 2$ $= 2^{-x} \cdot 2 - 2$ $= 2\left(\frac{1}{2}\right)^x - 2$ 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	$A = P(1 - i)^n$ $\frac{3}{4}x = x(1 - 0,082)^n$ $\frac{3}{4} = (0,918)^n$ $\therefore n = \log_{0,918} 0,75$ $n = 3,36$ $\therefore 4 \text{ years/jaar}$	<ul style="list-style-type: none"> ✓ 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 <p style="text-align: right;">(4)</p>
6.2	$F_v = \frac{x[(1+i)^n - 1]}{i}$ $58480 = \frac{x \left[\left(1 + \frac{0,09}{12}\right)^{71} - 1 \right]}{\frac{0,09}{12}} \left(1 + \frac{0,09}{12}\right)^2$ $\therefore x = \text{R } 617,45$	<ul style="list-style-type: none"> ✓ $\frac{0,09}{12}$ ✓ 71 ✓ correct substitution/korrekte substitusie ✓ $\left(1 + \frac{0,09}{12}\right)^2$ ✓ answer <p style="text-align: right;">(5)</p>

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

QUESTION 7/VRAAG 7		
	-1 for notation only ONCE in this question -1 vir notasie slegs EEN keer in hierdie vraag	
7.1	$f(x) = -x^2 - 2$ $f(x+h) = -(x+h)^2 - 2$ $= -x^2 - 2xh - h^2 - 2$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-x^2 - 2xh - h^2 - 2 - (-x^2 - 2)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2xh - h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-2x - h)}{h}$ $= -2x$	✓ $f(x+h)$ ✓ 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	$D_x \left[(2x^{-1} - \sqrt{5})^2 \right]$ $= D_x \left[4x^{-2} - 4\sqrt{5}x^{-1} + 5 \right]$ $= -8x^{-3} + 4\sqrt{5}x^{-2}$	✓ 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/vergeliking 1 $f'(x) = 6x^2 + 2ax + b$ $\therefore 0 = 6(2)^2 + 2a(2) + b$ $4a + b = -24$ equation 2/vergeliking 2 Equation 2 – equation 1/vergeliking 2 – vergeliking 1 $2a = -10$ $a = -5 \quad \therefore b = -24 - 4(-5) = -4$ ALTERNATIVE/ALTERNATIEWE From equation 1/Uit vergeliking 1: $b = -14 - 2a$ Substitute in equation 2/Vervang in vergeliking 2: $-24 = 4a - 14 - 2a$ $2a = -10$ $a = -5 \quad \therefore b = -24 - 4(-5) = -4$	✓ substitute/vervang (2; -9) ✓ equation 1/vergeliking 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)

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

QUESTION 9/VRAAG 9		
9.1	$V = l \times b \times h$ $1000\text{cm}^3 = 2x\text{cm} \times x\text{cm} \times h\text{cm}$ $\therefore h = \frac{1000}{2x^2} = \frac{500}{x^2}$	✓ formula volume/formule volume ✓ substitution/ substitusie (2)
9.2	$SA = 2\left(x \times \frac{500}{x^2}\right) + 2\left(2x \times \frac{500}{x^2}\right) + 2(x \times 2x)$ $= \frac{1000}{x} + \frac{2000}{x} + 4x^2$ $= 3000x^{-1} + 4x^2$ $\therefore \frac{dA}{dx} = -3000x^{-2} + 8x$ $8x^3 = 3000$ $x^3 = 375$ $x = 7,21$ $\therefore l = 14,42\text{cm}; b = 7,21\text{cm}; h = 9,62\text{cm}$	✓ 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 $P(B) = x$ $0,4 = 3x + x - 3x^2$ $3x^2 - 4x + 0,4 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{4 \pm \sqrt{(-4)^2 - 4(3)(0,4)}}{2(3)}$ $x = \frac{4 \pm \sqrt{11,2}}{6}$ $x = 1,22n.a$ $x = 0,11$ $\therefore P(B) = 0,11$	✓ $P(A \text{ and } B) = P(A)$ $\times P(B)$ ✓ standard form/standaardvorm ✓ correct substitution/korrekte substitusie ✓ Answers with choice/antwoorde met keuse (4)

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