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NOTE:

- If a candidate answers a question TWICE, mark only the first one.
- Consistent accuracy applies in ALL aspects of the marking memorandum.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die eerste poging.
- Volgehoue akkuraatheid is geurgans op ALLE aspekte van die memorandum van toepassing.

QUESTION/ VRAAG 1 (23)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
1.1.1	$x(5x + 2) = 0$ $x = 0$ or/ of $x = -\frac{2}{5}$	✓✓ Each root/ Elke wortel	(2)
1.1.2	$2x^2 - 3x - 4 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-4)}}{2(2)}$ $= \frac{3 \pm \sqrt{41}}{4}$ $x = -0,85$ or/ of $x = 2,35$	✓ Std form/ vorm ✓ Substitution/ substitusie ✓✓ Each root/ elke wortel $x = -0,85$ or/ of $x = 2,35$ (-1, if incorrect rounding)	(4)
1.1.3	$x^2 - x - 6 \geq 6$ $x^2 - x - 12 \geq 0$ $(x + 3)(x - 4) \geq 0$  $x < -3$ or/ of $x > 4$	✓ std form/ vorm ✓ factors/ faktore ✓ both critical values/ beide kritieke waardes ✓ notation / notasie	(4)
1.2	$x = y + 3$(1) Subst (1) into (2): $x^2 + xy - 2y^2 = 0$(2) $\therefore (y + 3)^2 + y(y + 3) - 2y^2 = 0$ $\therefore y^2 + 6y + 9 + y(y + 3) - 2y^2 = 0$ $\therefore y^2 + 6y + 9 + y^2 + 3y - 2y^2 = 0$ $\therefore 9y + 9 = 0$ $\therefore y = -1$ $\therefore x = 2$ OR/OF	✓ x subject/ onderwerp ✓ subst in (2) ✓ simplify / vereenvoudig ✓ value of y / Waarde van y ✓ value of x/ Waarde van x	(5)

	$y = x - 3$(1) Subst (1) into (2): $x^2 + xy - 2y^2 = 0$(2) $\therefore x^2 + x(x - 3) - 2(x - 3)^2 = 0$ $\therefore x^2 + x^2 - 3x - 2x^2 + 12x - 18 = 0$ $\therefore 9x - 18 = 0$ $\therefore x = 2$ $\therefore y = -1$	y subject / onderwerp ✓ subst in (2) ✓ simplify / vereenvoudig ✓ value of x / Waarde van x ✓ value of y / Waarde van y	(5)
1.3	$x = \frac{-2 \pm \sqrt{13 - 2k}}{3}$ $\therefore \Delta = 13 - 2k \geq 0$ $\therefore 2k \leq 13$ $\therefore k \leq \frac{13}{2}$ $\therefore$ If $k = 6$, Δ is a perfect square and roots rational/ As $k = 6$ sal Δ 'n volkome vierkant wees en wortels Rasionaal	✓ $\Delta \geq 0$ ✓ value/ waarde $k \leq \frac{13}{2}$ ✓ deriving $k = 6$ / afleiding $k = 6$ Answer only/ Slegs antwoord = FULL MARKS/VOLPUNTE	(3)
1.4	If graphs intersect/ as grafieke sny: $f(x) = g(x)$ $\therefore x^2 - 2x - 3 = 2x + a$ $\therefore x^2 - 4x - 3 - a = 0$ If graphs do not intersect/ As grafieke nie sny nie: $\Delta < 0$ $(-4)^2 - 4(1)(-3 - a) < 0$ $\therefore 16 + 12 + 4a < 0$ $\therefore 4a < -28$ $\therefore a < -7$	✓ equating f and g / stel f en g gelyk ✓ $\Delta < 0$ ✓ Subst. ✓ Simplify/ Vereenv ✓ answer/ antw.	(5)
			[23]

QUESTION/ VRAAG 2 (15)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
2.1.1	$3\frac{1}{2}$; 3 ; $2\frac{1}{2}$	✓ Answer/ Antw.	(1)
2.1.2	Arithmetic sequence/ Rekenkundige ry; $d = -\frac{1}{2}$ or /of $\frac{1}{2}$ is subtracted each time/ $\frac{1}{2}$ word elke keer afgetrek	✓ AS/ RR; ✓ $d = -\frac{1}{2}$	(2)
2.1.3	$T_n = a + (n - 1)d$; $a = 3\frac{1}{2}$; $d = -\frac{1}{2}$; $T_n = -44,5$; $n = ?$ $\therefore -44\frac{1}{2} = 3\frac{1}{2} + (n - 1)\left(-\frac{1}{2}\right)$ $\therefore 4 - \frac{1}{2}n = -44\frac{1}{2}$ $\therefore -\frac{1}{2}n = -\frac{97}{2}$ $\therefore n = 97$	✓ Subst into/ in T_n ✓ $T_n = -44,5$ ✓ Answer/ Antw	(3)

2.2.1	$18 + 6 + 2 + \dots$ GS with $r = \frac{1}{3}$ / <i>MR met $r = \frac{1}{3}$</i> Thus no negative term / <i>Dus geen term negatief.</i>	✓ GS with $r = \frac{1}{3}$ / <i>MR met $r = \frac{1}{3}$</i> ✓ no negative term / <i>geen term negatief</i>	(2)
2.2.2	$T_{10} = ar^{n-1} ; a = 18; r = \frac{1}{3} ; n = 10$ $= 18\left(\frac{1}{3}\right)^9$ $= \frac{2}{2187}$	✓ Subst into/ in T_n ✓ Answer/ Antw	(2)
2.2.3	$S_{\infty} - S_{10} ; a = 18; r = \frac{1}{3} ; n = 10$ $= \frac{a}{1-r} - \frac{a(1-r^n)}{1-r}$ $= \frac{18}{1-\frac{1}{3}} - \frac{18\left[1-\left(\frac{1}{3}\right)^{10}\right]}{1-\frac{1}{3}}$ $= 27 - 27\left[1-\left(\frac{1}{3}\right)^{10}\right]$ $= 4,57 \times 10^{-4}$	✓ Correct sum formulae ✓✓ Subst into sum formulae/ <i>Subst in somformules: $a = 18; r = \frac{1}{3} ; n = 10$</i> ✓ Simplify/ Vereenv ✓ answer/ antw	(5)
			[15]

QUESTION/ VRAAG 3 (11)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
3.1	$-3 - 5; -7 - \dots - 65 ; AS/RR: a = -3; n = 32; d = -2 ; l = -65$ $S_n = \frac{n}{2}[2a + (n-1)d] \quad \text{OR/OF} \quad S_n = \frac{n}{2}[a + l]$ $S_{32} = \frac{32}{2}[2(-3) + (32-1)(-2)] \quad \left \quad S_{32} = \frac{32}{2}[(-3) + (-65)] \right.$ $= \frac{32}{2}[-6 - 62] = -1088$	✓ $n = 32.$ ✓ Subst in sum formula/ <i>Subst in somformule</i> ✓ answer/ antw	(3)
3.2.1	$6 ; 5 + x ; -6 ; 6x$ $x + 5 - 6; -6 - (5 + x); 6x - (-6)$ $x - 1; -x - 11; 6x + 6 ; 1^{\text{st}} \text{ diff/ verskil}$ $-x - 11 - (x - 1) = 6x + 6 - (-x - 11) ; 2^{\text{nd}} \text{ diff/verskil}$ $\therefore -2x - 10 = 7x + 17$ $\therefore x = -3$	✓ 1 st diff/ verskille ✓ 2 nd diff/verskille ✓ 2 nd diff/verskille = ✓ Simplify/ Vereenv.	(4)
3.2.2	Sequence/ Ry: 6 ; 2 ; -6 ; -18; ... $-4 ; -8 ; -12 \quad 1^{\text{st}} \text{ diff/ verskil}$ $-4 ; -4 \quad 2^{\text{nd}} \text{ diff/ verskil}$ $2a = -4 \Rightarrow a = -2$ $3a + b = -4 \Rightarrow 3(-2) + b = -4 \Rightarrow b = 2$ $a + b + c = 6 \Rightarrow -2 + 2 + c = 6 \Rightarrow c = 6$ $\therefore T_n = -2n^2 + 2n + 6$	✓ $a = -2$ ✓ $b = 2$ ✓ $c = 6$ ✓ Equation/ Vergelyking	(4)
			[11]

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
4.1	$OC = 6$ units/ <i>eenhede</i> A; B: x -intercepts/ <i>afsnitte</i> : Let/ <i>Stel</i> $y = 0$ $\therefore -2x^2 - 4x + 6 = 0$ $\therefore x^2 + 2x - 3 = 0$ $\therefore (x + 3)(x - 1) = 0$ $\therefore x = -3$ OR/OF $x = 1$ A(-3; 0) and/ <i>en</i> B(1; 0) $\Rightarrow AB = 4$ units/ <i>eenhede</i>	$\checkmark OC = 6$ $\checkmark$ Let/ <i>Stel</i> $y = 0$ $\checkmark$ Factors/ <i>Faktore</i> $\checkmark$ Both x -values/ <i>Beide x-waardes</i> $\checkmark$ answer/ <i>antw</i>	(5)
4.2	$x = -\frac{b}{2a} = -\left[\frac{-4}{2(-2)}\right] = -1$ OR/OF $f'(x) = -4x - 4 = 0 \Rightarrow x = -1$	$\checkmark$ Subst $\checkmark x = -1$ OR/OF $\checkmark$ Derivative/ <i>Afgeleide</i> $= 0$ $\checkmark x = -1$	(2)
4.3	Subst. $x = -1$ in $f(x)$ $\therefore ST = -2(-1)^2 - 4(-1) + 6$ $= 8$ units/ <i>eenhede</i>	$\checkmark$ Subst. $x = -1$ $\checkmark$ answer/ <i>antw</i>	(2)
4.4	$m_{AC} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0-6}{-3-0} = 2$	$\checkmark$ Subst. in m $\checkmark$ answer/ <i>antw</i>	(2)
4.5	$m_g = 2$; // lines/ <i>lyne</i> but/ <i>maar</i> $m_g = f'(x) = -4x - 4 = 2$ $\therefore x = -\frac{3}{2}$ $\therefore y = -2\left(-\frac{3}{2}\right)^2 - 4\left(-\frac{3}{2}\right) + 6 = 7\frac{1}{2}$ $\Rightarrow D\left(-\frac{3}{2}; 7\frac{1}{2}\right)$ OR/OF Let eq. of tangent be/ <i>Laat vgl. van raakl.</i> : $y = mx + k$ $m_g = 2$; // lines/ <i>lyne</i> $\Rightarrow y = 2x + k$ at D: $f(x) = g(x) \therefore -2x^2 - 4x + 6 = 2x + k$ $\therefore -2x^2 - 6x + 6 - k = 0 \dots\dots\dots(1)$ For tangent/ <i>Vir raaklyn</i> : $\Delta = 0$ $\therefore (-6)^2 - 4(-2)(6 - k) = 0$ $\therefore 36 + 48 - 8k = 0 \Rightarrow k = 10,5$ $\therefore -2x^2 - 6x + 6 - 10,5 = 0 \dots\dots$ Subst k in (1) $\therefore 2x^2 + 6x + 4,5 = 0$ or/ <i>of</i> $4x^2 + 12x + 9 = 0$ $\therefore (2x + 3)^2 = 0 \Rightarrow x = -\frac{3}{2}$ $\therefore y = 2\left(-\frac{3}{2}\right) + 10,5 = 7\frac{1}{2}$ $\Rightarrow D\left(-\frac{3}{2}; 7\frac{1}{2}\right)$	$\checkmark m_g = 2$ $\checkmark m_g = f'(x)$ $\checkmark -4x - 4 = 2$ $\checkmark x = -\frac{3}{2}$ $\checkmark y = 7\frac{1}{2}$ $\checkmark m_g = 2$ $\checkmark$ eqn/ <i>vgl.</i> : $-2x^2 - 6x + 6 - k = 0$ $\checkmark k = 10,5$ $\checkmark x = -\frac{3}{2}$ $\checkmark y = 7\frac{1}{2}$	(5)
4.6	$a = -1$; the axis of symmetry/ <i>die simmetrie-as</i> OR/OF : $f(a + t) = f(a - t)$ $\therefore -2(a + t)^2 - 4(a + t) + 6 = -2(a - t)^2 - 4(a - t) + 6$ $\therefore -2a^2 - 4at - 2t^2 - 4a - 4t + 6 = -2a^2 + 4at - 2t^2 - 4a + 4t + 6$ $\therefore 8at + 8t = 0$ $\therefore 8t(a + 1) = 0$ $\therefore t = 0$ or/ <i>of</i> $a = -1$	$\checkmark\checkmark a = -1$ $\checkmark$ Subst. $\checkmark a = -1$	(2)

QUESTION/ VRAAG 5 (10)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
5.1	$x = 1$	✓ answer/ antw	(1)
5.2	x -int/afsn: Let/ Stel $y = 0$ $\frac{2+x}{x-1} = 0 \Rightarrow x = -2$ $\therefore A(-2; 0)$	✓ $y = 0$ ✓ $x = -2$	(2)
5.3	y -int/afsn: Let/ Stel $x = 0$ $\frac{2+0}{0-1} = y \Rightarrow y = -2$ $\therefore B(0; -2)$ Area/ Opp $\triangle AOB = \frac{1}{2} AO \times OB$ $= \frac{1}{2} (2)(2) = 2 \text{ units}^2 / \text{eenh}^2$	✓ $B(0; -2)$ ✓ Subst. in Area formula ✓ answer/ antw	(3)
5.4	$f(x) = \frac{2+x}{x-1} = \frac{x-1+3}{x-1}$ $= \frac{x-1}{x-1} + \frac{3}{x-1}$ $= \frac{3}{x-1} + 1$	✓ $\frac{2+x}{x-1} = \frac{x-1+3}{x-1}$ ✓ Simplify to/ Vereenv. tot: $\frac{x-1}{x-1} + \frac{3}{x-1}$	(2)
5.5	(3; 1)	✓ 3 (CA from/ vanaf 5.2 - shift 2 units to the right/ skuif 2 eenh regs) ✓ 1	(2)
			[10]

QUESTION/ VRAAG 6 (8)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
6.1.1	$y > -1; y \in \mathbb{R}$	✓ ✓ $y > -1; y \in \mathbb{R}$	(2)
6.1.2	$g(x) = 2^x$ $\therefore g^{-1}: y = \log_2 x$	✓ $g(x) = 2^x$ ✓ $y = \log_2 x$	(2)
6.2.1	$k(x) = 3x^2; x \leq 0$	✓ $k(x) = 3x^2$ ✓ $x \leq 0$	(2)
6.2.2	(0; 0) OR/OF origin/ oorsprong	✓ ✓ Answer/ Antw	(2)
			[8]

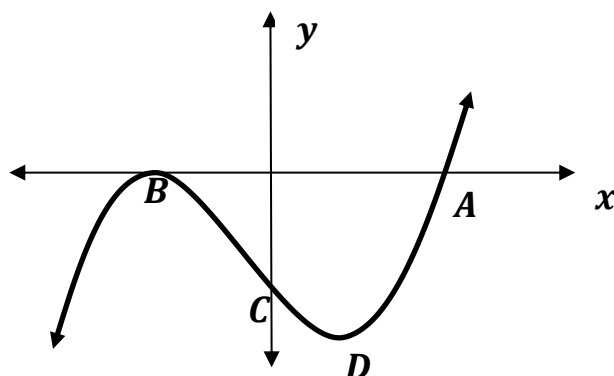
QUESTION/ VRAAG 7 (14)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
7.1	$A = P(1 - i)^n$; $P = R128\ 000$; $A = R45\ 500$; $n = 6$; $i = ?$ $45\ 500 = 128\ 000(1 - i)^6$ $\therefore \sqrt[6]{\frac{45\ 500}{128\ 000}} = 1 - i$ $\therefore i = 1 - \sqrt[6]{\frac{45\ 500}{128\ 000}}$ $\therefore i = 0,15834 = 15,83\% \text{ p.a./ p.j}$	✓ Subst. of $P = 128\ 000$ into depreciation formula ✓ Subst. of 45 500 and/ en $n = 6$ ✓ i the subject/ die onderwerp ✓ Answer/ Antw	(4)
7.2.1	$A = P(1 + i)^n$; $A = ?$; $P = 250\ 000$; $n = 12y = 48$ quarters; $i = 9,5\% \text{ p.a} = \frac{9,5}{400} \text{ per quarter/ per kwartaal}$ $\therefore A = 250\ 000(1 + \frac{9,5}{400})^{48}$ $= R\ 771\ 343,67$	✓ Subst $i = \frac{9,5}{400} = 0,02375$ ✓ Subst $n = 48$ in correct formula ✓ Answer/ Antw	(3)
7.2.2	Home loan/ Huislening = $2\ 920\ 000 - 771\ 343,67$ = R2 148 656, 33	✓ Answer/ Antw	(1)
7.2.3	$P_v = \frac{x[1 - (1 + i)^{-n}]}{i}$; $P_v = 2\ 148\ 656,33$; $i = 10,3\% \text{ p.a}$ $= \frac{10,3}{1200} \text{ p/m}$; $n = 20y = 240 \text{ m}$ $\therefore 2\ 148\ 656,33 = \frac{x \left[1 - \left(1 + \frac{10,3}{1200} \right)^{-240} \right]}{\frac{10,3}{1200}}$ $\therefore x = R\ 21\ 163,87$ OR/OF $F_v = \frac{x[(1 + i)^n - 1]}{i}$ $\therefore 2\ 148\ 656,33 \left(1 + \frac{10,3}{1200} \right)^{240} = \frac{x \left[\left(1 + \frac{10,3}{1200} \right)^{240} - 1 \right]}{\frac{10,3}{1200}}$ $\therefore x = R\ 21\ 163,87$	✓ Subst into correct formula ✓ Subst $i = \frac{10,3}{1200}$ ✓ Subst $n = 240$ ✓ Answer/ Antw	(4)
7.2.4	Interest/ Rente = Amount paid/ bedrag betaal- original loan/ lening = $21\ 163,87 \times 240 - 2\ 148\ 656,33$ = R 2 930 672, 47	✓ Calculation/ berekening ✓ Answer/ Antw	(2)
			[14]

QUESTION/ VRAAG 8 (15)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
8.1	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{2}{x+h} - \frac{2}{x}}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{2x - 2(x+h)}{x(x+h)}}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{2x - 2x - 2h}{x^2 + xh}}{h}$ $= \lim_{h \rightarrow 0} \frac{-2h}{x(x+h)} \times \frac{1}{h}$ $= \lim_{h \rightarrow 0} \frac{-2}{x^2 + xh}$ $= \lim_{h \rightarrow 0} \frac{-2}{x^2 + x(0)}$ $f'(x) = \frac{-2}{x^2}$	✓ Subst $f(x+h)$ and/ en $-f(x)$ ✓ Common denominator/ Gemene noemer ✓ Simplify/ Vereenv ✓ Subst. $h = 0$ ✓ Answer/ Antw	(5)
8.2.1	$h(x) = 2x^3 - \frac{4}{x} + 3\sqrt{x}$ $\therefore h(x) = 2x^3 - 4x^{-1} + 3x^{\frac{1}{2}}$ $\therefore h'(x) = 6x^2 + 4x^{-2} + \frac{3}{2}x^{-\frac{1}{2}}$	✓ Exponential form/ eksponensiële vorm ✓✓✓ Answer / Antw (-1 for notation in question / -1 vir notasie in vraag)	(4)
8.2.2	$D_x \left(\frac{8x^3 - 27}{2x - 3} \right)$ $= D_x \left(\frac{(2x - 3)(4x^2 + 6x + 9)}{2x - 3} \right)$ $= D_x(4x^2 + 6x + 9)$ $= 8x + 6$	✓ Simplify fraction/ Vereenv breuk ✓✓ Ans. / Antw	(3)
8.3	$m_{tan} = f'(x) = -3x^2 - 2$ $= -(3x^2 + 2)$ Which is always/ wat altyd < 0	✓ $m_{tan} = f'(x) = -3x^2 - 2$ ✓ $-(3x^2 + 2)$ ✓ Explain/ Verduidelik	(3)
			[15]

QUESTION/ VRAAG 9 (15)



#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
9.1	$f(x) = x^3 + x^2 - x - 1$ $\therefore (x-1)(x^2 + 2x + 1) = 0$ $\therefore (x-1)(x+1)(x+1) = 0$ $\therefore x = 1$ or/of $x = -1$ $\therefore AB = 2$ units / eenhede	$\checkmark (x-1)$ $\checkmark (x^2 + 2x + 1)$ $\checkmark (x+1)(x+1)$ $\checkmark$ Both roots/ Beide wortels $\checkmark AB = 2$	(5)
9.2	$f'(x) = 0$ $\therefore 3x^2 + 2x - 1 = 0$ $\therefore (3x-1)(x+1) = 0$ $\therefore x = \frac{1}{3}$ or / of $x = -1$ $\therefore y = -\frac{32}{27}$ $\therefore D\left(\frac{1}{3}; -\frac{32}{27}\right)$	$\checkmark$ Derivative/ Afgeleide = 0 $\checkmark$ Values of x / Waardes van x $\checkmark$ Coordinates of D/ Koördinate van D	(3)
9.3	$f''(x) = 0$ $\therefore 6x + 2 = 0$ $\therefore x = -\frac{1}{3}$ $\leftarrow h''(x) < 0 \quad \left \quad h''(x) > 0 \rightarrow\right.$ $\qquad \qquad \qquad -\frac{1}{3}$ The concavity changes at $x = -\frac{1}{3}$ Die konkawiteit verander by $x = -\frac{1}{3}$	$\checkmark$ Linking second derivative with concavity / Verbind tweede afgeleide met konkawiteit $\checkmark 6x + 2 = 0$ $\checkmark$ explanation / verduideliking	(3)
9.4.1	$x > 1$	$\checkmark$ Answer/ Antw.	(1)
9.4.2	$x < -1$ or/of $-\frac{1}{3} < x < 1$	$\checkmark x < -1$ $\checkmark -\frac{1}{3} < x < 1$ $\bullet$ Notation (-1) / Notasie (-1)	(3)
			[15]

QUESTION/ VRAAG 10 (7)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
10.1	$t = 2$ $D(2) = 3 + \frac{1}{2}(2)^2 - \frac{1}{4}(2)^3$ $= 3 + 2 - 2$ $= 3 \text{ m}$	✓ Answer/Antw.	(1)
10.2	$D'(t) = t - \frac{3}{4}t^2$ $D'(3) = 3 - \frac{3}{4}(3)^2$ $= -3,75 \text{ m/h}$	✓ derivative / afgeleide ✓ Answer/Antwoord	(2)
10.3	$D'(t) = 0$ $t - \frac{3}{4}t^2 = 0$ $\times -4: 3t^2 - 4t = 0$ $t(3t - 4) = 0$ $t = 0 \text{ or/of } t = 1\frac{1}{3} = 1 \text{ h } 20 \text{ m}$ $\therefore \text{Time/Tyd} : 10:20$	✓ $D'(t) = 0$ ✓ factors / faktore ✓ both answers / beide antwoorde ✓ Final answer / Finale antw.	(4)
			[7]

QUESTION/ VRAAG 11 (14)

#	SUGGESTED ANSWER/ VOORGESTELDE ANTWOORD	DESCRIPTORS/BESKRYWERS	Mark/ Punt
11.1.1	$P(\text{female and/} \cap \text{green eyes}) = \frac{147}{540} = \frac{49}{180} = 27,22\%$ $P(\text{vrou en/} \cap \text{groen oë}) = \frac{147}{540} = \frac{49}{180} = 27,22\%$	$\frac{147}{540}$ or / of $\frac{49}{180}$ or/ of 27,22% ✓✓ Answer/ Antw	(2)
11.1.2	For events to be independent: $P(\text{female and/} \cap \text{green eyes}) = P(\text{green eyes}) \times P(\text{female})$ $P(\text{green eyes}) \times P(\text{female}) = \frac{330}{540} \times \frac{240}{540} = \frac{22}{81} = 0,27$ $P(\text{female and/} \cap \text{green eyes}) = \frac{147}{540} = \frac{49}{180} = 0,27$ $\therefore P(\text{female and/} \cap \text{green eyes}) = P(\text{green eyes}) \times P(\text{female})$ Events are independent and the learner is correct. <i>Vir gebeure om onafhanklik te wees:</i> $P(\text{vrou en/} \cap \text{groen oë}) = P(\text{groen oë}) \times P(\text{vrou})$ $P(\text{groen oë}) \times P(\text{vrou}) = \frac{330}{540} \times \frac{240}{540} = \frac{22}{81} = 0,27$ $P(\text{vrou en/} \cap \text{groen oë}) = \frac{147}{540} = \frac{49}{180} = 0,27$	✓ $P(\text{green eyes}) = 330/540$ ✓ $P(\text{female}) = 240/540$ ✓ 0,27 ✓ $P(\text{female and/} \cap \text{green eyes}) = 0,27$ ✓ Deduction ✓ $P(\text{groen oë}) = 330/540$ ✓ $P(\text{vrou}) = 240/540$ ✓ 0,27	

	$P(\text{vrou en} / \cap \text{groen oë}) = P(\text{groen oë}) \times P(\text{vrou})$ <i>Gebeure is onafhanklik en die leerder is korrek.</i> Alternative/Alternatief: For events to be independent: $P(\text{male and} / \cap \text{green eyes}) = P(\text{green eyes}) \times P(\text{male})$ $P(\text{green eyes}) \times P(\text{male}) = \frac{330}{540} \times \frac{300}{540} = \frac{55}{162} = 0,34$ $P(\text{male and} / \cap \text{green eyes}) = \frac{183}{540} = \frac{61}{180} = 0,34$ $P(\text{male and} / \cap \text{green eyes}) = P(\text{green eyes}) \times P(\text{male})$ Events are independent and the learner is correct. <i>Vir gebeure om onafhanklik te wees:</i> $P(\text{manlik en} / \cap \text{groen oë}) = P(\text{groen oë}) \times P(\text{manlik})$ $P(\text{groen oë}) \times P(\text{manlik}) = \frac{330}{540} \times \frac{300}{540} = \frac{55}{162} = 0,34$ $P(\text{manlik en} / \cap \text{groen oë}) = \frac{183}{540} = \frac{61}{180} = 0,34$ $P(\text{manlik en} / \cap \text{groen oë}) = P(\text{groen oë}) \times P(\text{manlik})$ <i>Gebeure is onafhanklik en die leerder is korrek.</i>	✓ $P(\text{vrou en} / \cap \text{groen oë}) = 0,27$ ✓ Afleiding ✓ $P(\text{green eyes}) = 330/540$ ✓ $P(\text{male}) = 300/540$ ✓ 0,34 ✓ $P(\text{male and} / \cap \text{green eyes}) = 0,34$ ✓ Deduction ✓ $P(\text{groen oë}) = 330/540$ ✓ $P(\text{manlik}) = 300/540$ ✓ 0,34 ✓ $P(\text{manlik en} / \cap \text{groen oë}) = 0,34$ ✓ Afleiding	(5) (5)
11.2.1	$n(S) = \frac{10!}{2! \times 2! \times 3!} = 151200$	✓ Numerator/ Teller ✓ Denominator/ Noemer ✓ Answer / Antw	(3)
11.2.2	$n(E) = \frac{8!}{2! \times 2!} = 10080$ $\therefore P(E) = \frac{10080}{151200} = \frac{1}{15}$	✓ $\frac{8!}{2! \times 2!}$ ✓ 10080 ✓ $P(E) = \frac{10080}{151200}$ ✓ Answer / Antw	(4)
			[15]

TOTAL/ TOTAAL: 150