Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIORSERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2023

MATHEMATICS P1 MARKING GUIDELINE/ *WISKUNDE V1 NASIENRIGLYN*

MARKS/*PUNTE*: **150** 106 44

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

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 vir substitusie in die korrekte formule toegeken.

QUESTION 1/*VRAAG 1*

1.1.1	$x^2-9=0$ **OR / OF** $x^2-9=0$ $(x+3)(x-3)=0$ $\checkmark x^2=9$ $x+3=0$ or/*of* $x-3=0$ $x=\pm\sqrt{9}$ $x=-3$ or/*of* $x=3$ $\checkmark x=\pm 3$ ao 2/2 **OR / *OF*** $x^2-9=0$ $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\dfrac{-(0)\pm\sqrt{(0)^2-4(1)(-9)}}{2(1)}$ $=\dfrac{\pm\sqrt{36}}{2}$ $x=-3$ or / *of* $x=3$ Answers only – Full marks *Slegs antwoorde - Volpunte*	✓ factors / *faktore* ✓ both answers / *beide antwoorde* **OR / *OF*** ✓ correct substitution into correct formula / *korrekte vervanging in korrekte formule* ✓ both answers / *beide antwoorde* (2)

2

1.1.2

$$x-5+\frac{2}{x}=0$$

$$x^2-5x+2=0$$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$x=\frac{-(-5)\pm\sqrt{(-5)^2-4(1)(2)}}{2(1)}$$

$$x=\frac{5\pm\sqrt{17}}{2}$$

$$\therefore x=4,56 \text{ or/of } x=0,44$$

Penalise 1 mark for incorrect rounding off. / *Penaliseer 1 punt vir verkeerde afronding.*

LCD = x $(\therefore x\neq 0)$ x thru

✓ standard form / *standaardvorm*

✓ substitution / *vervanging*

✓✓ x-values / *waardes*

(4)

1.1.3

$$x=1+\sqrt{7-x}$$

$$x-1=\sqrt{7-x}$$

$$(x-1)^2=\left(\sqrt{7-x}\right)^2$$

$$x^2-2x+1=7-x$$

$$x^2-x-6=0$$

$$(x+2)(x-3)=0$$

$$\therefore x\neq -2 \text{ or / of } x=3$$

NB

✓ isolating surd / *isoleer wortelvorm*

✓ square both sides / *kwadreer beide kante*

∴ check solutions !!!

✓ standard form / *standaardvorm*

✓ factors / *faktore*

✓ selection / keuse

(5)

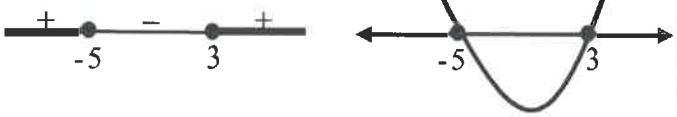
1.1.4

$$x^2+2x-15\geq 0$$

$$(x+5)(x-3)\geq 0$$

critical values/*kritieke waardes*

$x=-5$ or/*of* $x=3$ CV



$x\leq -5$ *or / of* $x\geq 3,\ x\in\mathbf{R}$

OR/*OF*

$x\in(-\infty;-5]$ *or / of* $x\in[3;\infty),\ x\in\mathbf{R}$

$x\leq 5$ or $3\leq x$ A or O

✓ critical values / *kritieke waardes*

✓✓ $x\leq -5$ *or / of* $x\geq 3,\ x\in\mathbf{R}$
(accuracy / *akkuraatheid*)

OR/*OF*

$x\in(-\infty;-5]$ *or / of* $x\in[3;\infty),\ x\in\mathbf{R}$

(3)

4

5

3

1.2	$y+2x=3$ .....(1) $y^2-y=3x^2-5x$ .....(2) *From / Vanaf* (1): $y=-2x+3$ .....(3) (3) into/*in* (2): $(-2x+3)^2-(-2x+3)=3x^2-5x$ $4x^2-12x+9+2x-3=3x^2-5x$ $4x^2-12x+9+2x-3-3x^2+5x=0$ $x^2-5x+6=0$ $(x-2)(x-3)=0$ $x=2$ or/*of* $x=3$ $y=-1$ or/*of* $y=-3$	✓ $y=-2x+3$ ✓ substitution / *vervanging* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ *x*-values / *waardes* ✓ *y*-values / *waardes*
	OR / *OF*	**OR / *OF***
	$y+2x=3$ .....(1) $y^2-y=3x^2-5x$ .....(2) $x=\frac{3-y}{2}$ .....(3) Subst. / *Verv.* (3) into / *in* (2): $y^2-y=3\left(\frac{3-y}{2}\right)^2-5\left(\frac{3-y}{2}\right)$ $y^2-y=3\left(\frac{9-6y+y^2}{4}\right)-5\left(\frac{3-y}{2}\right)$ $y^2-y=\frac{27-18y+3y^2}{4}+\frac{-15+5y}{2}$ $4y^2-4y-27+18y-3y^2+30-10y=0$ $y^2+4y+3=0$ $(y+1)(y+3)=0$ $y=-1$ or / *of* $y=-3$ $x=2$ or / *of* $x=3$	✓ $x=\frac{3-y}{2}$ ✓ substitution / *vervanging* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ *y*-values / *waardes* ✓ *x*-values / *waardes* (6)

1.3	$\sqrt[n]{\dfrac{10^n+2^{n+2}}{5^{2n}+4(5^n)}}$ $=\left[\dfrac{2^n\times5^n+2^n.2^2}{5^n.5^n+4(5^n)}\right]^{\frac{1}{n}}$ $=\left[\dfrac{2^n(5^n+4)}{5^n(5^n+4)}\right]^{\frac{1}{n}}$ $=\left[\left(\dfrac{2}{5}\right)^n\right]^{\frac{1}{n}}$ $=\dfrac{2}{5}$	✓ $\dfrac{2^n\times5^n+2^n.2^2}{5^n.5^n+4(5^n)}$ ✓ factors / *faktore* ✓ changing surd to exponent / *verandering van wortel na eksponent* ✓ answer / *antwoord* (4)
		[24]

QUESTION 2/*VRAAG 2*

2.1.1	$r=\frac{T_3}{T_2}=\frac{6x}{12}$ $=\frac{x}{2}$ ✓	✓ answer / *antwoord* (1)
2.1.2	$-1<r<1$ $-1<\frac{x}{2}<1$ ✓ $-2<x<2$ ✓	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
2.1.3	$x=4 \Rightarrow a=6$ & $r=2$ $S_{15}=\frac{a\left(r^n-1\right)}{r-1}$ $=\frac{6\left(2^{15}-1\right)}{2-1}$ ✓ $=196\,602$ ✓	✓ values of a and r / *waardes van a en r* ✓ substitution / *vervanging* ✓ answer / *antwoord* (3)
2.2	$T_1=6(2)^{-1}=3$ $T_2=6(2)^{-2}=\frac{3}{2}$ $\therefore r=\frac{1}{2}$ $S_\infty=\frac{a}{1-r}$ $=\frac{3}{1-\frac{1}{2}}$ ✓ $=6$ ✓	✓ values of a and r / *waardes van a en r* ✓ substitution / *vervanging* ✓ answer / *antwoord* (3)

2.3.1	$S_{15} = -(15)^2 + 8(15)$ $= -105$	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
2.3.2	$T_{15} = S_{15} - S_{14}$ $= -105 - (-84)$ $= -21$	✓ method / *metode* ✓ answer / *antwoord* (2)
2.3.3	$T_1 = S_1 = 7$ $S_2 = -(2)^2 + 8(2) = 12$ $\therefore T_2 = 5$ $\Rightarrow d = -2$ $a + (n-1)d = T_n$ $7 + (n-1)(-2) = -169$ $7 - 2n + 2 = -169$ $-2n = -178$ $n = 89$ **OR / *OF*** $S_n - S_{n-1} = T_n$ $-n^2 + 8n - [-(n-1)^2 + 8(n-1)] = -169$ $-n^2 + 8n - [-n^2 + 2n - 1 + 8n - 8] = -169$ $-n^2 + 8n + n^2 - 2n + 1 - 8n + 8 = -169$ $-2n = -178$ $n = 89$ **OR / *OF*** $a + 14d = -21$ $7 + 14d = -21$ $14d = -28$ $d = -2$	✓ $T_2 = 5$ **OR / OF** $14d = -28$ ✓ $d = -2$ ✓ substitution / *vervanging* ✓ answer / *antwoord* ✓ formula / *formule* ✓ substitution / *vervanging* ✓ simplification / *vereenvoudiging* ✓ answer / *antwoord* (4)
		[17]

QUESTION 3/*VRAAG 3*

3.1	95 ; 72 ; y ; 32 ; ... -23 ; $y-72$; $32-y$; ... (first diff. / *eerste verskille*) $y-49$; $-2y+104$ $\therefore\ y-49=-2y+104$ ✓ $3y=153$ $y=51$ ✓	✓ equating 2nd differences / *gelykstel van 2de verskille* ✓ answer / *antwoord* (2)
3.2	**95 ; 72 ; 51 ; 32** **-23 ; -21 ; -19** **2 ; 2** $2a=2$ $3(1)+b=-23$ $1-26+c=95$ $a=1$ ✓ $b=-26$ ✓ $c=120$ ✓ $T_n=n^2-26n+120$ ✓	✓ 2nd difference / 2de *verskil* ✓ $a=1$ ✓ $b=-26$ ✓ $c=120$ (4)
3.3	$T_{22}=(22)^2-26(22)+120$ $=32$ ✓	✓ answer / *antwoord* (1)
3.4	$n^2-26n+120=1040$ ✓ $n^2-26n-920=0$ ✓ $(n-46)(n+20)=0$ ✓ $n=46$ *or / of* $n\neq -20$ *reject* **OR / *OF*** $n^2-26n+120=1040$ $n^2-26n-920=0$ $n=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\dfrac{-(-26)\pm\sqrt{(-26)^2-4(1)(-920)}}{2(1)}$ $\therefore n=46$ *or / of* $n\neq -20$	✓ equating / *gelykstel* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ answer / *antwoord* **OR / *OF*** ✓ equating / *gelykstel* ✓ standard form / *standaardvorm* ✓ substitution / *vervanging* ✓ answer / *antwoord* (4)
		[11]

QUESTION 4/*VRAAG 4*

4.1	S(0;3)	2	✓✓ answer / *antwoord* (2)
4.2.1	$x=-\frac{b}{2a}=-\frac{10}{2(-5)}$ ✓ $x=-1$ T(−1;−2) ✓✓	$y=5(-1)^2+10(-1)+3$ ✓ $y=-2$	4 ✓ method /*metode* ✓ *x*-coordinate / *x-koördinaat* ✓ substitution / *vervanging* ✓ *y*-coordinate / *y-koördinaat* (4)
4.2.2	$p=1$ and / *en* $q=-2$ ✓✓	2	✓ $p=1$ ✓ $q=-2$ (2)
4.2.3	$\frac{5}{x+1}-2=0$ ✓ $\therefore x=\frac{3}{2}$ ✓ 3/2 $\Rightarrow$ OR = 1,5 units / *eenhede* ✓	2	✓ equating to 0 / *stel gelyk aan* 0 ✓ answer / *antwoord* (2)
4.2.4	$y\geq -2$ ✓	$y\in[-2;\infty)$ 2	✓✓ answer / *antwoord* (2)
4.3.1	$m_{tan}=y'$ $=10x+10$ $=10(0)+10$ $=10$	$y=10x+c$ $c=3$ clearly $\therefore y=10x+3$	3 ✓ $m=10$ ✓ substitution into eqn of line / *vervanging in verg. van lyn* ✓ answer / antwoord (3)
4.3.2	$y=(x+1)-2$ ✓ $y=x-1$ ✓ **OR / *OF***	$y=x+k$ $-2=-1+k$ $k=-1$ $\therefore y=x-1$ 2	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
4.4	$x\geq\frac{3}{2}$		2 ✓✓ answer / *antwoord* (A) (2)
			[19]

$y=\frac{5}{x+p}+q$ $\quad y=\frac{5}{x+1}-2$

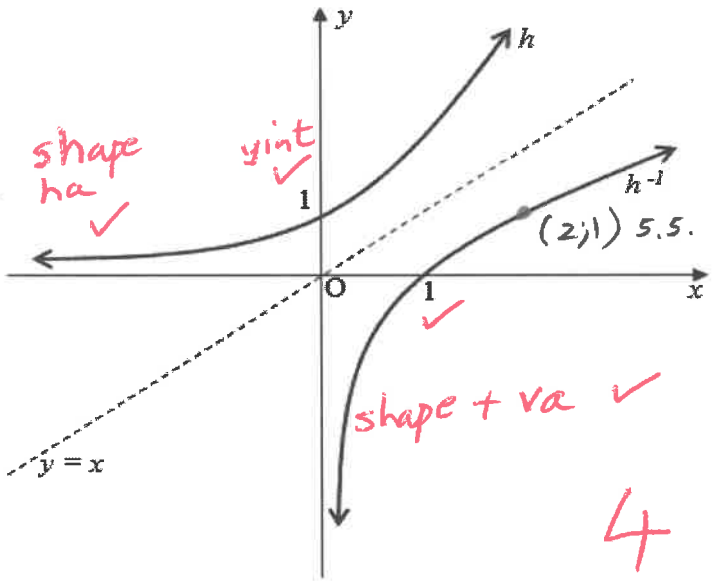
AOS: $x+p=0$ $\quad x=-1$

$x=-p$

$-p=-1$

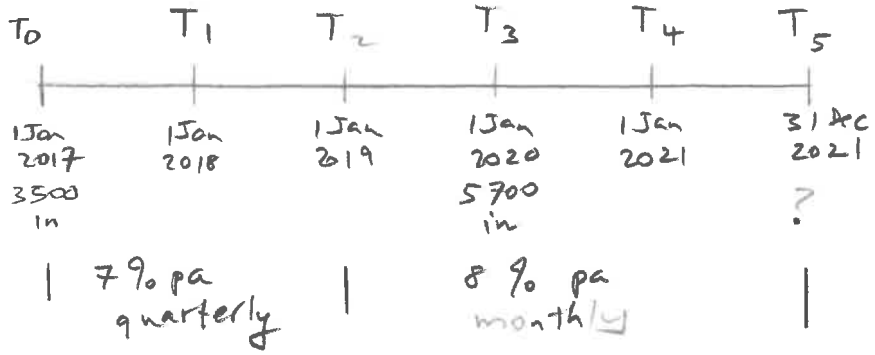
$\therefore p=1$

QUESTION 5/*VRAAG 5*

5.1	$h(x)=a^x$ $\frac{1}{2}=a^{-1}$ ✓ $\therefore a=2$ ✓ Sub $B(-1;\frac{1}{2})$ $(\frac{1}{2})^{-1}=(a^{-1})^{-1}$ 2	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
5.2	$y=2^x$ $x=2^y$ ✓ $\therefore h^{-1}(x): y=\log_2 x$ ✓ 2	✓ interchanging x and y / *omruil van x en y* ✓ answer / *antwoord* (2)
5.3	 4	✓ y-intercept for h / *y-afsnit vir h* ✓ shape and asymptote of h *vorm en asimptoot van h* ✓ x-intercept for h^{-1} / *x-afsnit vir* h^{-1} ✓ shape and asymptote of h^{-1} *vorm en asimptoot van* h^{-1} (4)
5.4	$x>0$ ✓ $x\in(0;\infty)$ 1	✓ answer / *antwoord* (1)
5.5	$h^{-1}(x)>1$ $y_{h^{-1}}>1$ $x\in(2;\infty)$ ✓ $h^{-1}(x)=1$ $\log_2 x=1$ $2^1=x$ $(2;1)$ 1	✓ answer / *antwoord* **OR / *OF*** ✓ answer / *antwoord* (1)
5.6.1	$t(x)=\left(\frac{1}{2}\right)^x-1$ $=2^{-x}-1$ $h: y=(\frac{1}{2})^x$ $x\to -x$ $\downarrow 1$ 2 • reflection about the y-axis / *refleksie om die y – as* ✓ • shift of 1 unit down / *skuif van 1 eenheid af* ✓	✓ reflection / *refleksie* ✓ shift / *skuif* (2)
5.6.2	$y=-1$ ✓ 1	✓ answer / *antwoord* (1)
		[13]

QUESTION 6/*VRAAG 6*

6.1	$A = P(1-i)^n$ $A = 980\,000(1-\frac{9{,}12}{100})^7$ $A = R498\,685{,}82$	✓ formula / *formule* ✓ substitution / *vervanging* ✓ answer / *antwoord* (3)
6.2	$A = P(1+i)^n$ $20\,020{,}28 = 13\,500(1+\frac{8{,}2}{100})^n$ $1{,}4829837037 = 1{,}082^n$ $\therefore n = \frac{\log 1{,}48\ldots}{\log 1{,}082}$ $n = 5$ years / *jaar*	✓ substitution / *vervanging* ✓ simplification / *vereenvoudiging* ✓ use of logs / *gebruik van logs* ✓ answer / *antwoord* (4)
6.3	Amount in savings account / *Bedrag in spaarrekening* : $= 3500\left(1+\frac{7}{400}\right)^8\left(1+\frac{8}{1200}\right)^{36} + 5700\left(1+\frac{8}{1200}\right)^{24}$ $= R11\,793{,}19$ **OR / *OF*** $T_0 - T_2$ $A_1 = 3500\left(1+\frac{7}{400}\right)^8 = R4\,021{,}08624$ $T_2 - T_3$ $A_2 = 4\,021{,}08624\left(1+\frac{8}{1200}\right)^{12} = R4\,354{,}834415$ $T_3 - T_5$ $A_3 = 4\,354{,}83441 + 5\,700 = R10\,054{,}834415$ Final Amount / *Finale Bedrag* $= 10\,054{,}83441\left(1+\frac{8}{1200}\right)^{24}$ $= R11\,793{,}19$	✓ $n = 8$ and / *en* $i =$ 7/400 ✓ substitution / *vervanging* ✓ $n = 36$ and / *en* $i =$ 8/1200 ✓ substitution / *vervanging* ✓ addition / *optelling* ✓ answer / *antwoord* **OR / *OF*** ✓ $n = 8$ and / *en* $i =$ 7/400 ✓ substitution / *vervanging* ✓ $n = 12$ and / *en* $i =$ 8/1200 ✓ addition / *optelling* ✓ substitution / *vervanging* ✓ answer / *antwoord* (6)
		[13]



QUESTION 7/*VRAAG 7*

Penalise 1 mark for incorrect notation in this question
Penaliseer 1 punt vir verkeerde notasie in hierdie vraag

7.1

$$f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$$

$$=\lim_{h\to 0}\frac{5-2(x+h)^2-\left(5-2x^2\right)}{h}$$

$$=\lim_{h\to 0}\frac{5-2x^2-4xh-2h^2-5+2x^2}{h}$$ ✓ $5-2x^2-4xh-2h^2$

$$=\lim_{h\to 0}\frac{-4xh-2h^2}{h}$$ ✓ simplification / *vereenvoudiging*

$$=\lim_{h\to 0}\frac{h(-4x-2h)}{h}$$ ✓ factorisation / *faktorisering* (dividing by h / *deel deur* h)

$$=\lim_{h\to 0}(-4x-2h)$$

$$=-4x$$ ✓ answer / *antwoord*

Answer ONLY: 0 marks
SLEGS antwoord: 0 *punte*

(4)

7.2.1

$$f(x)=2x^5-7\sqrt{x}+\frac{1}{x}$$

$$=2x^5-7x^{\frac{1}{2}}+x^{-1}$$ ✓ $2x^5-7x^{\frac{1}{2}}+x^{-1}$

$$f'(x)=10x^4-\frac{7}{2}x^{-\frac{1}{2}}-x^{-2}$$ ✓ $10x^4$ ✓ $-\frac{7}{2}x^{-\frac{1}{2}}$ ✓ $-x^{-2}$

$$=10x^4-\frac{7}{2\sqrt{x}}-\frac{1}{x^2}$$

(4)

7.2.2

$$\frac{d}{dx}\left[\frac{2x^2-x-6}{2x+3}\right]$$

$$\frac{d}{dx}\left[\frac{(2x+3)(x-2)}{(2x+3)}\right]$$ ✓ factors / *faktore*

$$\frac{d}{dx}[x-2]$$

$$=1$$ ✓ simplification / *vereenvoudiging*

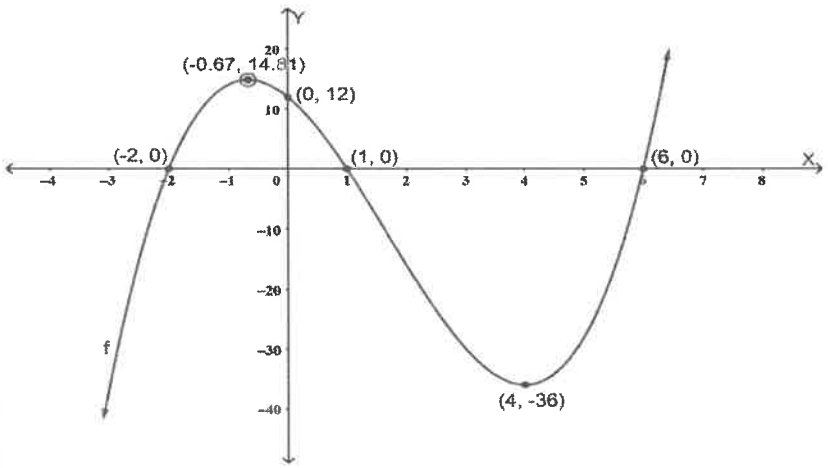
✓ answer / *antwoord*

(3)

[11]

20

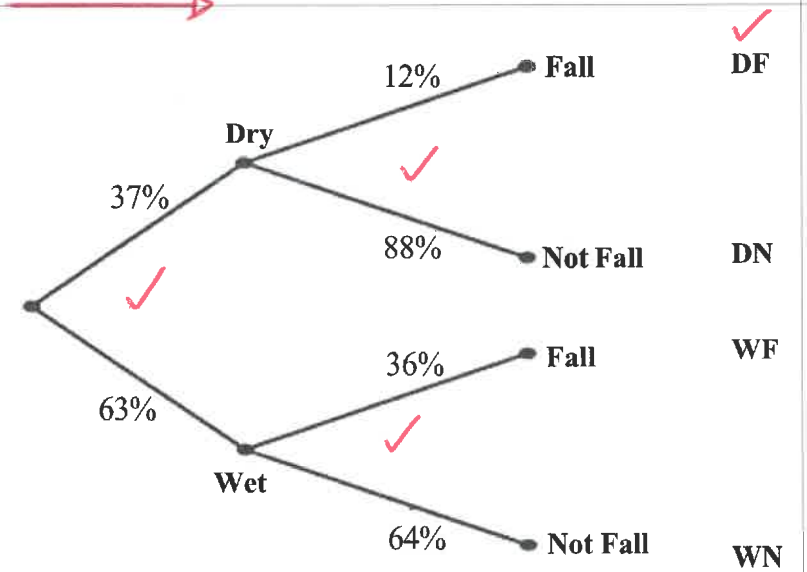
QUESTION 8/*VRAAG 8*

8.1	$f'(x)=3x^2-10x-8=0$ $(3x+2)(x-4)=0$ $x=-\frac{2}{3}$ or / *of* $x=4$ $y=\frac{400}{27}\ (14,81)$ or / *of* $y=-36$ $\mathrm{L}\left(-\frac{2}{3};\frac{400}{27}\right)$ *and / en* $\mathrm{M}(4;-36)$	✓ $f'(x)=0$ ✓ factors / *faktore* ✓ x-values / *x-waardes* ✓ y-values / *y-waardes* (4)
8.2	$f(x)=x^3-5x^2-8x+12=0$ $(x-6)(x-1)(x+2)=0$ $\therefore\ x=6\ ;\ x=1\ ;\ x=-2$	✓ factors / *faktore* ✓ $x=1$ ✓ $x=-2$ (3)
8.3		✓ x-intercepts / *x-afsnitte* ✓ y-intercept / *y-afsnit* ✓ turning points / *draaipunte* ✓ shape / *vorm* (4)
8.4	$m=\frac{0-(-16)}{6-2}=4$ $y-y_1=m(x-x_1)$ $y-0=4(x-6)$ $y=4x-24$ $\therefore\ a=4$ and / *en* $q=-24$	✓ $a=4$ ✓ $q=-24$ (2)
8.5	$f''(x)=6x-10$ $f''(2)=6(2)-10$ $=2>0$ $\Rightarrow$ concave up / *konkaaf op*	✓ $f''(x)$ ✓ substitution / *vervanging* ✓ conclusion / *gevolgtrekking* (3)
8.6	$4x-24=-36$ $x=-3$ $\therefore\ -3\le x\le 2$ or / *of* $x\ge 6$	✓ equating / *gelyk stel* ✓ $x=-3$ ✓✓ answer /*antwoord* (4)
		[20]

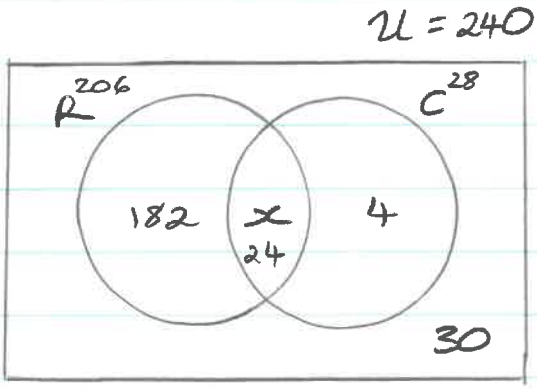
08 **QUESTION 9/*VRAAG 9***

9.1	Hourly cost = fuel cost + other costs *Uurlikse koste = brandstofkoste + ander koste* $= 4x^2 + 1000$ Duration of trip/*Tydsduur van reis* $= \frac{\text{distance/}afstand}{\text{speed/}spoed} = \frac{500}{x}$ Total cost/*Totale koste* = (hourly cost/*uurlikse koste*) × (number of hours/*aantal ure*) $C(x) = (4x^2 + 1000) \times \left(\frac{500}{x}\right)$ $= 2000x + \frac{500\,000}{x}$	✓ $4x^2 + 1000$ ✓ $\frac{500}{x}$ ✓ $\left(4x^2 + 1000\right) \times \left(\frac{500}{x}\right)$ (3)
9.2	$C'(x) = 2000 - \frac{500\,000}{x^2} = 0$ $2000x^2 - 500\,000 = 0$ $2000x^2 = 500\,000$ $x^2 = 250$ $x = \sqrt{250} = 15,81 km/h$	✓ $C'(x)$ ✓ $C'(x) = 0$ ✓ standard form / *standaardvorm* ✓ simplification / *vereenvoudiging* ✓ answer / *antwoord* (5)
		[8]

QUESTION 10/*VRAAG 10*

10.1	$P(A \text{ or / } of\ B) = P(A) + P(B)$ ✓ $P(A \cap B) = 0$ mut excl $0,64 = 3P(B) + P(B)$ ✓ $0,64 = 4P(B)$ $\therefore\ P(B) = 0,16$ ✓	✓ rule / *reël* ✓ substitution / *vervanging* ✓ answer / *antwoord* 3 (3)
10.2.1		✓ 37% and / *en* 63% ✓ 12% and / *en* 88% ✓ 36% and / *en* 64% ✓ outcomes / *uitkomste* 4 (4)
10.2.2	$P(F') = P(DF') + P(WF')$ $= \frac{37}{100} \times \frac{88}{100} + \frac{63}{100} \cdot \frac{64}{100} = \frac{7288}{10\,000} = \frac{911}{1250}$ $= 0,73$	✓ $(37\% \times 88\%) + (63\% \times 64\%)$ ✓ answer / *antwoord* 2 (2)
10.3.1	$182 + x + 4 + 30 = 240$ **OR / OF** $x + 182 = 206$ **OR / OF** $x + 4 = 28$ $x = 240 - 216$ $x = 24$ $x = 24$ $x = 24$	✓ equation / *vergelyking* ✓ answer / *antwoord* (2)
10.3.2	For independent events *Vir onafhanklike gebeurtenisse* $P(R) \times P(C) = P(R \cap C)$ $P(R \text{ and / } en\ C) = \frac{24}{240} = 0,10$ $P(R) \times P(C)$ $= \left(\frac{206}{240}\right) \times \left(\frac{28}{240}\right)$ $= 0,10$ $\therefore$ Yes, the events are independent. *Ja, die gebeurtenisse is onafhanklik.*	✓ $P(R \cap C) = 0,10$ ✓ $P(R) \times P(C) = 0,10$ ✓ conclusion / *gevolgtrekking* (3)
		[14]
		TOTAL/*TOTAAL*: 150

10.3. 1.



2

$182 + x = 206$ ✓ OR $x + 4 = 28$ OR $182 + x + 4 + 30 = 240$

$x = 24$ ✓ $x = 24$ $x = 24$

10.3.2. $P(R \cap C) = \frac{24}{240}$

$= \frac{1}{10}$

$= 0,10$ ✓

$P(R) \times P(C) = \frac{206}{240} \times \frac{28}{240}$

$= \frac{721}{7200}$

$= 0,10$ ✓

∴ to 2 dec places : NB See question!

$P(R \cap C) = P(R) \times P(C)$

∴ Playing rugby and cricket are independent events

∴ Yes ✓

3