Province of the EASTERN CAPE EDUCATION

SU/file

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIORSERTIFIKAAT*

GRADE/*GRAAD* 11

NOVEMBER 2023

MATHEMATICS P1/*WISKUNDE V1* MARKING GUIDELINE/*NASIENRIGLYN*

MARKS/*PUNTE*: 150

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

NOTE/*LET WEL*:

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

1.1.1	$x^2-3x=0$ $x(x-3)=0$ ✓ $\therefore x=0$ or / *of* $x=3$ ✓ ans only 1/2 — 2	✓ factorisation / *faktorisering* ✓ answers / *antwoorde* (2)
1.1.2	$x(3x+1)=5$ $3x^2+x-5=0$ ✓ $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\dfrac{-1\pm\sqrt{1^2-4(3)(-5)}}{2(3)}$ ✓ $=\dfrac{-1\pm\sqrt{61}}{6}$ $=1{,}14$ or / *of* $-1{,}47$ ✓ — 4	✓ standard form / *standaardvorm* ✓ substitution / *vervanging* ✓✓ answers / *antwoorde* (4)
1.1.3	$2x^2-5x+3<0$ $(2x-3)(x-1)<0$ ✓ $\therefore 1<x<1\frac{1}{2}$ ✓✓ or 0 + 0 − 0 + ; 1 ; $\frac{3}{2}$ — 3	✓ factors / *faktore* ✓ ✓ answer / *antwoord* (A) (3)
1.1.4	$2\sqrt{x+2}=x-1$ $\left(2\sqrt{x+2}\right)^2=(x-1)^2$ $4(x+2)=x^2-2x+1$ ✓ $4x+8=x^2-2x+1$ $x^2-6x-7=0$ ✓ $(x-7)(x+1)=0$ ✓ $\therefore x=7$ or / *of* $x\neq -1$ ✓✓ — 5	✓ squaring / *kwadreer* ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ both answers / *beide antwoorde* ✓ selection / *seleksie* (5)

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1.2

$x+3y=2 \quad (1)$

$x^2-3xy=4 \quad (2)$

$x=2-3y \quad (3)$ ✓

$(2-3y)^2-3y(2-3y)=4$ ✓

$4-12y+9y^2-6y+9y^2=4$

$18y^2-18y=0 \quad \div 18$ $y^2-y=0$ ✓

$18y(y-1)=0$ $y(y-1)=0$ ✓

$\therefore y=0$ or / *of* $y=1$ ✓

6

$\therefore x=2-3(0)$ or / *of* $x=2-3(1)$

$=2$ $x=-1$ ✓

OR/*OF*

$x+3y=2 \quad (1)$

$x^2-3xy=4 \quad (2)$

$y=\dfrac{2-x}{3} \quad (3)$

$x^2-3x\left(\dfrac{2-x}{3}\right)=4$

$x^2-x(2-x)=4$

$x^2-2x+x^2-4=0$

$2x^2-2x-4=0$

$x^2-x-2=0$

$(x-2)(x+1)=0$

$\therefore x=2$ or / *of* $x=-1$

$\therefore y=\dfrac{2-2}{3}$ or / *of* $y=\dfrac{2-(-1)}{3}$

$=0$ $=1$

✓ $x=2-3y$
✓ substitution / *vervanging*

✓ standard form / *standaardvorm*
✓ method/factors / *metode/faktore*
✓ both y-values / *beide y-waardes*

✓ both x-values / *beide x-waardes*

OR/*OF*

✓ $y=\dfrac{2-x}{3}$

✓ substitution / *vervanging*

✓ standard form / *standaardvorm*

✓ factors / *faktore*
✓ both x-values / *beide x-waardes*

✓ both y-values / *beide y-waardes*

(6)

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1.3

$(x-3)^2 = p^2-4$

$\sqrt{(x-3)^2} = \pm\sqrt{p^2-4}$

$\therefore \quad x-3 = \pm\sqrt{p^2-4}$

$\therefore x = 3 \pm \sqrt{p^2-4}$

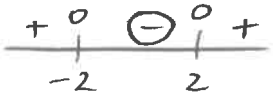
For non-real roots:

Vir nie-reële wortels:

$p^2-4<0$

$(p-2)(p+2)<0$

$\therefore -2<p<2$



OR/*OF*

$(x-3)^2 = p^2-4$

$x^2-6x+9 = p^2-4$

$x^2-6x+13-p^2 = 0$

For non-real roots: *Vir nie-reële wortels*

b^2-4ac

$=(-6)^2-4(1)(13-p^2)$

$=36-52+4p^2$

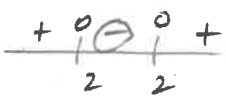
$=4p^2-16$

$4p^2-16<0$

$p^2-4<0$

$(p+2)(p-2)<0$

$-2<p<2$



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✓ square root / *vierkantswortel*

✓ $x = 3 \pm \sqrt{p^2-4}$

✓ $p^2-4<0$

✓ factors / *faktore*

✓ answer / *antwoord*

OR/*OF*

✓ expansion / *uitbreiding*

✓ standard form / *standaardvorm*

✓ $b^2-4ac<0$

✓ factors / *faktore*

✓ answer / *antwoord*

(5)

[25]

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QUESTION 2/*VRAAG 2*

2.1	$\frac{2^{n+1}-8.2^{n-3}}{2^{n-2}} = \frac{2^n.2-8.2^n.2^{-3}}{2^n.2^{-2}}$ ✓ $= \frac{2^n(2-8.2^{-3})}{2^n.2^{-2}}$ ✓ $= \frac{2-1}{2^{-2}}$ ✓ $= 4$ ✓	✓ numerator / *teller* ✓ denominator / *noemer* ✓ factorisation / *faktoriseering* ✓ answer / *antwoord* (4)
2.2.1	$\sqrt[x]{27} = 2187$ $27^{\frac{1}{x}} = 2187$ ✓ $\left(3^3\right)^{\frac{1}{x}} = 3^7$ **OR/*OF*** $3^{\frac{3}{x}} = 3^7$ $\therefore \frac{3}{x} = 7$ $\Rightarrow x = \frac{3}{7}$	$\frac{1}{x} = \frac{\log 2187}{\log 27}$ ✓ $\frac{1}{x} = \frac{7}{3}$ ✓ LCD = x $(\therefore x \neq 0)$ $3 = 7x$ $\frac{3}{7} = x$ ✓ ✓ $27^{\frac{1}{x}} = 2187$ ✓ $\left(3^3\right)^{\frac{1}{x}} = 3^7$ **OR/*OF*** $27^{x^{-1}} = 3^7$ ✓ equating exponents *gelyk stel van eksponente* ✓ answer / *antwoord* (4)
2.2.2	$4^x - 16 = 6.2^x$ $\left(2^x\right)^2 - 6.2^x - 16 = 0$ ✓ $(2^x - 8)(2^x + 2) = 0$ ✓ $\therefore 2^x = 8$ or / *of* $2^x \neq -2$ ✓ $\therefore 2^x = 2^3$ ✓ $\therefore x = 3$ ✓ **OR/*OF*** $4^x - 16 = 6.2^x$ $(2^x)^2 = 6.2^x - 16 = 0$ Let/*Laat* $k = 2^x$, $\therefore k^2 - 6k - 16 = 0$ $(k-8)(k+2) = 0$ $\therefore k = 8$ or/*of* $k = -2$ $\therefore 2^x = 8$ or/*of* $2^x \neq -2$ $2^x = 2^3$ $\therefore x = 3$	$2^{2x} - 6.2^x - 16 = 0$ no solve $\frac{\log 8}{\log 2}$ ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ selection / *seleksie* ✓ $2^x = 2^3$ ✓ answer / *antwoord* **OR/*OF*** ✓ standard form / *standaardvorm* ✓ factors / *faktore* ✓ selection / *seleksie* ✓ $2^x = 2^3$ ✓ answer / *antwoord* (5)

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2.3

$$\frac{x^2+1}{x^2-5}=\frac{\left(\sqrt{3}-2\right)^2+1}{\left(\sqrt{3}-2\right)^2-5}$$

$$=\frac{3-4\sqrt{3}+4+1}{3-4\sqrt{3}+4-5}$$

$$=\frac{8-4\sqrt{3}}{2-4\sqrt{3}} \times \frac{2+4\sqrt{3}}{2+4\sqrt{3}}$$

$$=\frac{\left(8-4\sqrt{3}\right)\left(2+4\sqrt{3}\right)}{\left(2-4\sqrt{3}\right)\left(2+4\sqrt{3}\right)}$$

$$=\frac{16+32\sqrt{3}-8\sqrt{3}-16.3}{4-16.3}$$

$$=\frac{24\sqrt{3}-32}{-44}$$

$$=\frac{4\left(6\sqrt{3}-8\right)}{-44} \text{ OR } \frac{24\sqrt{3}}{-44}+\frac{32}{44}$$

$$=\frac{6\sqrt{3}-8}{-11} \quad = -\frac{6}{11}\sqrt{3}+\frac{8}{11}$$

✓ substitution / *vervanging*

✓ $\frac{8-4\sqrt{3}}{2-4\sqrt{3}}$

✓ rationalisation / *rasionalisering*

✓ simplification / *vereenvoudiging*

✓ answer / *antwoord*

(5)

[18]

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QUESTION 3/*VRAAG 3*

3.1.1	17 ; 14 ; 11 ; ... ; −247 **8 ; 5**	✓ 8 ✓ 5 (2)
3.1.2	$T_n = 20 - 3n$ $T_n = 17 + (n-1)(-3)$ $= 17 - 3n + 3$	✓ 20 ✓ $-3n$ (2)
3.1.3	$T_n = 20 - 3n$ $\therefore T_{17} = 20 - 3(17)$ $= -31$	✓ substitution / *vervanging* ✓ answer / *antwoord* (2)
3.1.4	$T_n = 20 - 3n$ $-247 = 20 - 3n$ $-267 = -3n$ $\therefore n = 89$	✓ $T_n = -247$ ✓ answer / *antwoord* (2)
3.2	$2x+11$; 2 ; T_3 ; $2x-4$ $T_3 = \frac{2x-4-2}{2} + 2$ **OR / *OF*** $T_3 = \frac{2+2x-4}{2}$ $= \frac{2x-6}{2} + 2$ $= \frac{2x-2}{2}$ $= x-3+2$ $= x-1$ $= x-1$ $\therefore 2-(2x+11) = (x-1)-2$ $-2x-9 = x-3$ $-3x = 6$ $\therefore x = -2$ **OR/*OF*** $d = 2-(2x+11)$ $= -2x-9$ $2d = 2x-4-2$ $d = x-3$ $\therefore -2x-9 = x-3$ $-3x = 6$ $x = -2$	✓ method / *metode* ✓ simplifying / *vereenvoudiging* ✓ $T_3 = x-1$ ✓ equating / *gelykstel* ✓ answer / *antwoord* **OR/*OF*** ✓ $d = -2x-9$ ✓ $2d = 2x-4-2$ ✓ $d = x-3$ ✓ equating / *gelykstel* ✓ answer / *antwoord* (5)
		[13]

PTO

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3.2. $2x+11$; 2 ; T_3 ; $2x-4$

$T_3 = -2x-7$

$d = 2-(2x+11)$ $\quad 2d = 2x-4-(2)$

$= 2-2x-11$ $\quad 2d = 2x-6$ ✓

$= -2x-9$ ✓

If not 2d max ②/6 then b/d

$\therefore \quad 2(-2x-9) = 2x-6$ ✓

$-4x-18 = 2x-6$

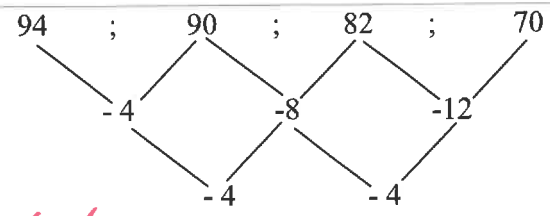
$-12 = 6x$

$-2 = x$ ✓

5

7.1.

QUESTION 4/*VRAAG 4*

4.1.1	 54 ; 34	54 ✓ and/*en* 34 ✓ (2)
4.1.2	$2a=-4$ $\therefore a=-2$ $3a+b=-4$ $3(-2)+b=-4$ $b=2$ $a+b+c=94$ $2-2+c=94$ $c=94$ $\therefore T_n=-2n^2+2n+94$	✓ $a=-2$ ✓ $b=2$ ✓ $c=94$ ✓ $T_n=-2n^2+2n+94$ (4)
4.1.3	First differences / *Eerste verskille*: $t_n=-4n$ $\therefore -136=-4n$ $\therefore n=34$ $\therefore T_n=-2n^2+2n+94$ $T_{34}=-2(34)^2+2(34)+94$ $=-2150$ $\therefore T_{35}=-2(35)^2+2(35)+94$ $=-2286$ **OR/*OF*** $T_{n+1}-T_n=-136$ $-2(n+1)^2+2(n+1)+94-(-2n^2+2n+94)=-136$ $-2(n^2+2n+1)+2n+2+94+2n^2-2n-94=-136$ $-2n^2-4n-2+2n+2+94+2n^2-2n-94=-136$ $\therefore -4n=-136$ $n=34$ $n+1=35$ $\therefore T_n=-2n^2+2n+94$ $T_{34}=-2(34)^2+2(34)+94$ $=-2150$ $\therefore T_{35}=-2(35)^2+2(35)+94$ $=-2286$	✓ method / *metode* ✓ $n=34$ ✓ $T_{34}=-2150$ ✓ $T_{35}=-2286$ **OR/*OF*** ✓ method / *metode* ✓ $n=34$ ✓ $T_{34}=-2150$ ✓ $T_{35}=-2286$ (4)

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OR

4.1.3. $T_n = -2n^2 + 2n + 94$

$T_{n-1} = -2(n-1)^2 + 2(n-1) + 94$

$= -2(n^2 - 2n + 1) + 2n - 2 + 94$

$= -2n^2 + 4n - 2 + 2n - 2 + 94$

$= -2n^2 + 6n + 90$

$T_n - T_{n-1} = -136$

$-2n^2 + 2n + 94 - (-2n^2 + 6n + 90) = -136$ ✓

$-2n^2 + 2n + 94 + 2n^2 - 6n - 90 = -136$

$-4n = -140$

$n = 35$ ✓

4

$\therefore T_{35} = -2(35)^2 + 2(35) + 94 = -2286$ ✓

$T_{34} = -2(34)^2 + 2(34) + 94 = -2150$ ✓

($T_{n-1} = -2n^2 + 6n + 90$

$T_{35-1} = -2(35)^2 + 6(35) + 90$

$T_{34} = -2150$)

4.2	$T_n = an^2 + bn - 15$ $T_1 = a + b - 15$ $T_2 = 4a + 2b - 15$ $\therefore T_2 - T_1 = 3a + b = 3$ $T_3 = 9a + 3b - 15$ $T_3 - T_2 = 5a + b = 7$ $\therefore 5a + b = 7$ $3a + b = 3$ $2a = 4$ $\therefore a = 2$ $b = -3$	✓ T_1 and/*en* T_2 and/*en* T_3 ✓ $3a + b = 3$ ✓ $5a + b = 7$ ✓ value for a / *waarde van a* ✓ value for b / *waarde van b* (5)
		[15]

QUESTION 5/*VRAAG 5*

5.1	$p = 3$ $q = -1$	✓ $p = 3$ ✓ $q = -1$ (2)
5.2	$f(x) = \frac{a}{x+3} - 1$ $y = \frac{a}{x+3} - 1$ $0 = \frac{a}{-5+3} - 1$ $1 = \frac{a}{-2}$ $\therefore a = -2$	✓ substituting for p and q / *vervanging vir p en q* ✓ substituting for x and y / *vervanging vir x en y* ✓ answer / *antwoord* (3)
5.3	$f(x) = \frac{a}{x+3} - 1$ $y = \frac{-2}{x+3} - 1$ $y = \frac{-2}{0+3} - 1$ $= -\frac{5}{3}$	✓ substituting $x = 0$ / *vervang x = 0* ✓ answer / *antwoord* (2)
5.4	$x \in \mathbb{R}$, but/*maar* $x \neq -3$	✓ $x \in \mathbb{R}$ ✓ $x \neq -3$ (2)
5.5	$y = -(x+3) - 1$ $= -x - 3 - 1$ $= -x - 4$	✓ $y = -(x+3) - 1$ ✓ answer / *antwoord* (2)
5.6	$-5 \leq x < -3$	✓✓ answer / *antwoord* (A) (2)

4 2. $T_n = an^2 + bn - 15$

$T_1 = a(1)^2 + b(1) - 15$
$= a + b - 15$

$T_2 = a(2)^2 + b(2) - 15$
$= 4a + 2b - 15$

$T_3 = a(3)^2 + b(3) - 15$
$= 9a + 3b - 15$

✓all 3

$T_2 - T_1 = 3$:

$4a + 2b - 15 - (a + b - 15) = 3$
$4a + 2b - 15 - a - b + 15 = 3$
$3a + b = 3$ ✓

$T_3 - T_2 = 7$:

$9a + 3b - 15 - (4a + 2b - 15) = 7$
$9a + 3b - 15 - 4a - 2b + 15 = 7$
$5a + b = 7$ ✓

$b = 3 - 3a$

$5a + (3 - 3a) = 7$
$5a + 3 - 3a = 7$
$2a = 4$
$a = 2$ ✓

$\therefore b = 3 - 3(2)$
$= -3$ ✓

5

5.1 $f: y = \frac{a}{x+p} + q$

- ha: $y = -1$ $\quad y = \dots - 1$
- va: $x = -3$

$x + 3 = 0$ $\quad y = \frac{\dots}{x+3} \dots$

So, $y = \frac{\dots}{x+3} - 1$ $\quad y = \frac{a}{x+p} + q$

$p = 3$ $\quad q = -1$

5.2 $y = \frac{a}{x+3} - 1$

sab $(-5; 0)$

$0 = \frac{a}{-5+3} - 1$

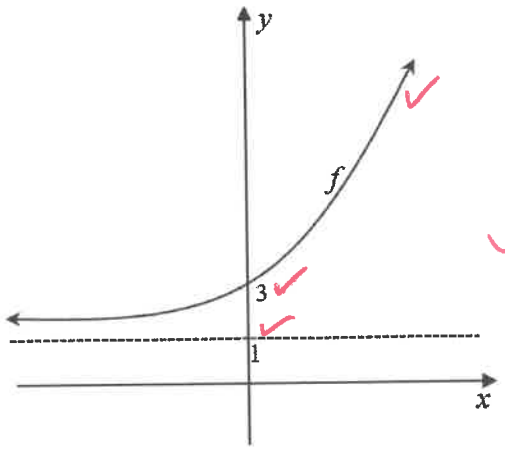
$1 = \frac{a}{-2}$

$-2 = a$

$$y = \frac{-2}{x+3} - 1$$

5.7	f is reflected in the x-axis and then shifted 4 units to the right. f *is gereflekteer in die x-as en dan 4 eenhede na regs geskuif.*	✓ reflected / *gereflekteer* ✓ x-axis / *x-as* ✓ 4 units / 4 *eenhede* ✓ right / *regs* (4)
		[17]

QUESTION 6/*VRAAG 6*

6.1	(0;3)	✓ answer / *antwoord* (1)
6.2	$y=1$	✓✓ answer / *antwoord* (2)
6.3		✓ y-intercept / *y-afsnit* ✓ asymptote / *asimptoot* ✓ shape (must be increasing) *vorm (moet stygend wees)* (3)
6.4	$y>-5$	✓✓answer / *antwoord* (A) (2)
		[8]

$x \to x+1$ $y \in (-5;\infty)$

∴ 1 unit ← does not affect range

57 $y = \frac{-2}{x+3} - 1 \longrightarrow y = \frac{2}{x-1} + 1$

$$y = \frac{-2}{x+3} - 1$$

refl x : $$-y = \frac{-2}{x+3} - 1$$

$$y = \frac{2}{x+3} + 1$$

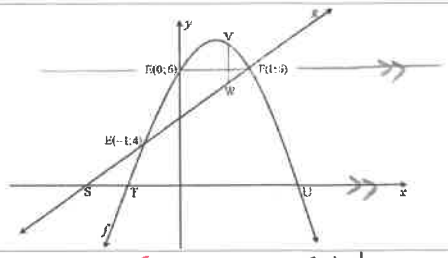
$x = -3$

4 → $$y = \frac{2}{x-4+3} + 1$$

$x = 1$

$$= \frac{2}{x-1} + 1$$

QUESTION 7/*VRAAG 7*



7.1	$x = \frac{1}{2}$ ✓ $x = \frac{0+1}{2}$ 1	✓ answer / *antwoord* (1)
7.2	$x > \frac{1}{2}$ ✓ OR $x \in (\frac{1}{2}; \infty)$ 1	✓ answer / *antwoord* (1)
7.3	Average gradient / *Gemiddelde gradiënt* $= \frac{4-6}{-1-0}$ ✓ $= 2$ ✓ 2	✓ method / *metode* ✓ answer / *antwoord* (2)
7.4	$g(x) = mx + q$ $m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{6-4}{1-(-1)}$ $= 1$ ✓ sub (1;6) or (−1;4) $\therefore y = x + q$ $6 = 1 + q$ or / *of* $4 = -1 + q$ ✓ sub $\therefore q = 5$ ✓ $\therefore g(x) = x + 5$ $y = x + 5$ 3	✓ $m = 1$ ✓ substituting a point *vervanging van 'n punt* ✓ $q = 5$ (3)
7.5	$f(x) = ax^2 + bx + c$ $c = 6$ ✓ $\therefore f(x) = ax^2 + bx + 6$ both ✓ $4 = a(-1)^2 + b(-1) + 6$ $\therefore -2 = a - b$ $6 = a(1)^2 + b(1) + 6$ $\therefore 0 = a + b$ ✓ simult method $-2 = a - b$ $0 = a + b$ $2a = -2$ $\therefore a = -1$ } both ✓ $b = 1$ 4 $\therefore f(x) = -x^2 + x + 6$	✓ $c = 6$ ✓ both substitutions / *beide vervangings* ✓ method / *metode* ✓ values of a and b *waardes van a en b* (4)

7.6	$g(x)=x+5$ $0=x+5$ ✓ $\therefore x=-5$ ✓ S(0;−5) $f(x)=-x^2+x+6$ $0=-x^2+x+6$ $x^2-x-6=0$ $(x-3)(x+2)=0$ ✓ $\therefore x=-2$ or / *of* $x=3$ ✓ $\therefore$ U(3;0) $\therefore$ SU = 3 − (−5) = 8 units / *eenhede* ✓	✓ substitution / *vervanging* ✓ S(0 ; –4) ✓ factors / *faktore* ✓ both x-intercepts *beide x-afsnitte* ✓ answer / *antwoord* (5)
7.7	$x \le -1$ or / *of* $x \ge 1$	✓ $x \le -1$ ✓ $x \ge 1$ A A (2)
7.8	$y_V - y_W = f(x)-g(x)$ $=(-x^2+x+6)-(x+5)$ ✓ $=-x^2+x+6-x-5$ $=-x^2+1$ ✓ $\therefore$ Max. length of VW is 1 unit ✓ *Maks. lengte van VW is 1 eenheid*	✓ $f(x)-g(x)$ ✓ answer / *antwoord* ✓ interpretation / *interpretasie* (3)
		[21]

$x \in (-\infty;-1]$ or $[1;\infty)$ $y_f - y_g \le 0$ $y_f \le y_g$ 2

5

3

$VW = -x^2 + 1$

$x_{tp} = \frac{-(0)}{2a} = 0$ $\quad y_{tp} = -(0)^2 + 1 = 1 = VW_{max}$

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QUESTION 8/*VRAAG 8*

8.1	$i_{eff}+1=\left(1+\frac{i_{nom}}{m}\right)^{m}$ ✓ $\frac{9,3}{1200}$ $=\left(1+\frac{0,093}{12}\right)^{12}-1$ ✓ $=0,09707$ $=9,71\%$ ✓ 3	✓ formula / *formule* ✓ substitution / *vervanging* ✓ answer / *antwoord* (3)
8.2	$A=P(1+i)^{n}$ $\frac{6,91}{100}$ ✓ $n=5$ $=R312000(1+0,0691)^{5}$ ✓ ci + sub $=R435\,758,88$ ✓ si 1/3 max 3	✓ $n=5$ ✓substitution / *vervanging* ✓ answer / *antwoord* (3)
8.3.1	$A=\left(23000\left(1+\frac{0,0925}{4}\right)^{12}+13500\right)\left(1+\frac{0,082}{12}\right)^{24}$ $=R51\,530,18$ − 9000 = R 42 530,18 **OR/*OF*** $A=\left(23000\left(1+\frac{0,0925}{4}\right)^{12}+13500\right)$ $=R43\,760,23$ $A=R43\,760,23\left(1+\frac{0,082}{12}\right)^{24}$ $=R51530,18$ − 9000 = R 42 530,18	✓$i=\frac{0,0925}{4}$ and/*en* $n=12$ ✓$i=\frac{0,082}{12}$ and/*en* $n=24$ ✓ $\left(23000\left(1+\frac{0,0925}{4}\right)^{12}+13500\right)$ ✓ $\left(1+\frac{0,082}{12}\right)^{24}$ ✓ answer / *antwoord* (5) **OR/*OF*** ✓ $i=\frac{0,0925}{4}$ and/*en* $n=12$ ✓ $i=\frac{0,082}{12}$ and/*en* $n=24$ ✓ $R51530,18$ ✓ $R43\,760,23\left(1+\frac{0,082}{12}\right)^{24}$ ✓ answer / *antwoord* (5)
8.3.2	$A=P(1+i)^{n}$ A ✓ i, n ✓ $64\,487,24=42530,18\left(1+\frac{i}{12}\right)^{36}$ ✓ sub $\therefore i=\left(\sqrt[36]{1,516\ldots}-1\right)\times 12$ $=0,1395\ldots$ 4 rate/*koers* = 13,96 % ✓	✓ $\frac{i}{12}$ and/*en* $n=36$ ✓ substituting / *vervang* $A=R64\,487,24$ ✓ substituting into correct formula *vervanging in korrekte formule* ✓ answer / *antwoord* (4)
		[15]

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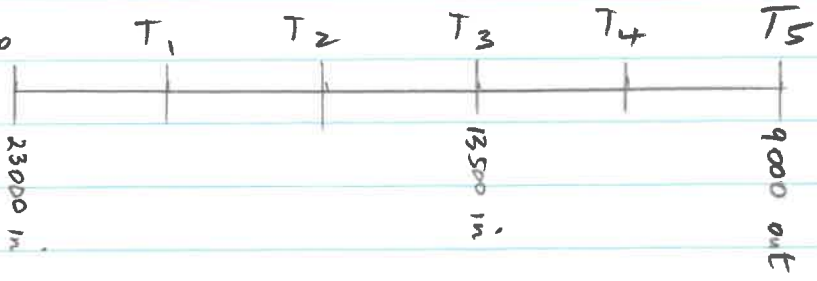
8.3



9,25 % pa quarterly | 8,2 % pa monthly

8.3.1 $A = P(1+i)^n$

Snowball

$T_0 - T_3$ $A = 23000(1 + \frac{9,25}{400})^{3\times4}$ ✓

$= 30\,260,22\ldots$

$T_3 - T_5$ $30\,260,22\ldots + 13500$ ✓

$= 43\,760,22\ldots$

$A = 43760,22\ldots(1 + \frac{8,2}{1200})^{2\times12}$ ✓

$= 51\,530,17\ldots$

$\therefore$ $51530,17\ldots - 9000$ ✓

$= \underline{R\ 42\,530,18}$ ✓

5

Parallel

23 000

$T_0 - T_3$ $A = 23000(1 + \frac{9,25}{400})^{3\times4}$ ✓

$= 30\,260,22\ldots$

$T_3 - T_5$ $A = 30\,260,22\ldots(1 + \frac{8,2}{1200})^{2\times12}$ ✓

$= 35\,633,15\ldots$ A

13500

$T_3 - T_5$ $A = 13500(1 + \frac{8,2}{1200})^{2\times12}$ ✓

$= 15897,02\ldots$ B

9000 C

$\therefore$ $A + B - C$ ✓

$= \underline{R\ 42\,530,18}$ ✓

5

8.3.2

$$A = P(1+i)^n$$

i, n ✓

$$64\,487{,}24 = 42\,530{,}18\left(1 + \frac{I}{1200}\right)^{3\times 12}$$ ✓ ✓

$$1{,}516\ldots = \left(1 + \frac{I}{1200}\right)^{36}$$

$$\sqrt[36]{1{,}516\ldots} = 1 + \frac{I}{1200}$$

$$13{,}96\,\% = I$$ ✓

4

13.2.

QUESTION 9/*VRAAG 9*

9.1.1

For mutually exclusive events:
Vir onderling uitsluitende gebeurtenisse:

$P(\text{A or B}) = P(\text{A}) + P(\text{B})$ − P(A and B)
$0,61 = 0,35 + P(\text{B})$ − 0
$\therefore P(B) = 0,61 - 0,35$
$= 0,26$

✓formula / *formule* with $P(A \cap B) = 0$
✓ substitution / *vervanging*
✓ answer / *antwoord*
(3)

9.1.2

For independent events:
Vir onafhanklike gebeurtenisse:

$P(\text{A or/}of\text{ B}) = P(\text{A}) + P(\text{B}) - P(\text{A and/}en\text{ B})$
$0,61 = 0,35 + P(\text{B}) - P(\text{A}).P(\text{B})$
$0,61 = 0,35 + P(\text{B}) - 0,35 \times P(\text{B})$
$0,61 = 0,35 + 0,65 \times P(\text{B})$
$\therefore 0,65 \times P(\text{B}) = 0,26$
$\therefore P(\text{B}) = \frac{0,26}{0,65}$
$= 0,4$

✓ formula $P(A \cap B) = P(A) \times P(B)$
✓ substitution / *vervanging*
✓ $0,61 = 0,35 + P(\text{B}) - 0,35 \times P(\text{B})$
✓ answer / *antwoord*
(4)

	Axis Phones	Direct Phones	Total
Defective	58	*a*	*b*
Not Defective	326	188	514
Total	384	*c*	600

9.2.1

$a = 28,\ b = 86,\ c = 216$

✓ $a = 28$ ✓ $b = 86$ ✓ $c = 216$
(3)

9.2.2

C
$\frac{216}{600} = \frac{9}{25}$ or / *of* 0,36

✓ answer / *antwoord*
(1)

9.2.3

P(not defective) + P(Axisphones and defective)
P*(nie foutief)* + P*(Axis Phones en foutief)*

$= \frac{514}{600} + \frac{58}{600}$

$= \frac{572}{600} = \frac{143}{150}$ or/*of* 0,95

✓ $\frac{514}{600}$ ✓ $+\frac{58}{600}$
✓ answer / *antwoord*
(3)

[14]

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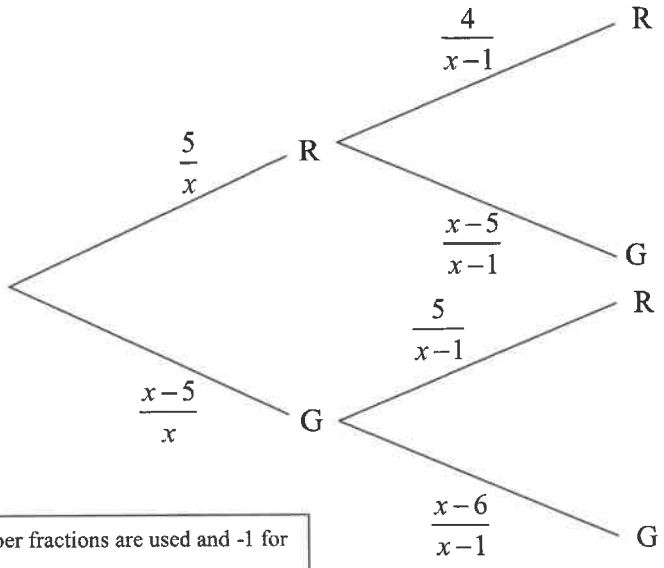
QUESTION 10/*VRAAG 10*

10.1



CA only if proper fractions are used and -1 for 2nd pick

VA slegs as egte breuke gebruik word en –1 vir tweede keuse.

$$P(\text{GG}) = P(\text{G}) \times P(\text{G})$$

$$= \frac{x-5}{x} \times \frac{x-6}{x-1}$$ ✓

$$\therefore \frac{x-5}{x} \times \frac{x-6}{x-1} = \frac{3}{11}$$ ✓

$$11(x-5)(x-6) = 3x(x-1)$$ ✓

$$11(x^2 - 11x + 30) = 3x^2 - 3x$$

$$11x^2 - 121x + 330 = 3x^2 - 3x$$

$$8x^2 - 118x + 330 = 0$$ ✓

$$4x^2 - 59x + 165 = 0 \quad \div 2$$

4

✓ $\frac{x-5}{x} \times \frac{x-6}{x-1}$

✓ equating to $\frac{3}{11}$ / *stel gelyk aan* $\frac{3}{11}$

✓ getting rid of fractions
raak ontslae van breuke

✓ standard form / *standaardvorm*

[4]

TOTAL/*TOTAAL*: 150

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