basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS/
SENIORSERTIFIKAAT-EKSAMEN/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN

MATHEMATICS P1/*WISKUNDE V1*

MAY/JUNE/*MEI/JUNIE* 2026

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

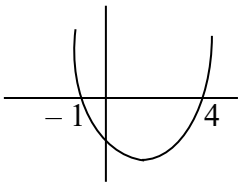
These marking guidelines consist of 15 pages.
Hierdie nasienriglyne bestaan uit 15 bladsye.

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NOTE:
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in all aspects of the marking guidelines.

LET WEL:
- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.*
- *Volgehoue akkuraatheid is DEURGAANS op ALLE aspekte van die nasienriglyne van toepassing.*

QUESTION1/*VRAAG* 1

1.1.1	$x^2-9=0$ $(x-3)(x+3)=0$ **OR/*OF*** $x^2=9$ $\therefore x=3$ or $x=-3$ $\therefore x=3$ or $x=-3$	✓ factors/root/formula ✓ both answers (2)
1.1.2	$2x^2+3x-7=0$ $x=\dfrac{-3\pm\sqrt{(3)^2-4(2)(-7)}}{2(2)}$ $x=\dfrac{-3\pm\sqrt{65}}{4}$ $\therefore x=1,27$ or $x=-2,77$	✓ correct substitution into correct formula ✓ answer ✓ answer (3)
1.1.3	$-x^2+3x>-4$ $-x^2+3x+4>0$ $x^2-3x-4<0$ $(x-4)(x+1)<0$ cv's: 4 ; -1 $-1<x<4$ **OR/*OF*** $x\in(-1\ ;\ 4)$ 	✓ standard form ✓ critical values ✓✓ answer (4)
1.1.4	$\sqrt{7x+2}+2x=8$ $\sqrt{7x+2}=8-2x$ $\left(\sqrt{7x+2}\right)^2=(8-2x)^2$ $7x+2=64-32x+4x^2$ $4x^2-39x+62=0$ $(4x-31)(x-2)=0$ $\therefore x\neq\dfrac{31}{4}$ or $x=2$	✓ isolating surd ✓ squaring both sides ✓ standard form ✓ answers with rejection (4)

1.2	$\frac{2^x.2^y}{4}=1$ $2^x.2^y=2^2$ $2^{x+y}=2^2$ $\therefore x+y=2$ $y=2-x \quad \ldots.(1)$ $-2x^2+3xy=y^2 \quad \ldots(2)$ $-2x^2+3x(2-x)=(2-x)^2$ $-2x^2+6x-3x^2=4-4x+x^2$ $-6x^2+10x-4=0$ $3x^2-5x+2=0$ $(3x-2)(x-1)=0$ $x=\frac{2}{3}$ or $x=1$ $y=\frac{4}{3}$ or/of $y=1$ **OR/*OF*** $\frac{2^x.2^y}{4}=1$ $2^x.2^y=2^2$ $2^{x+y}=2^2$ $\therefore x+y=2$ $x=2-y \quad \ldots.(1)$ $-2x^2+3xy=y^2 \quad \ldots(2)$ $-2(2-y)^2+3(2-y)y=y^2$ $-8+8y-2y^2+6y-3y^2=y^2$ $-6y^2+14y-8=0$ $3y^2-7y+4=0$ $(3y-4)(y-1)=0$ $y=\frac{4}{3}$ or/of $y=1$ $x=\frac{2}{3}$ or/of $x=1$	✓ exponential law ✓ isolating y ✓ substitution ✓ standard form ✓ both x-values ✓ both y-values (6) **OR/*OF*** ✓ exponential law ✓ isolating x ✓ substitution ✓ standard form ✓ both y-values ✓ both x-values (6)
1.3	$\left(\sqrt{6p}+\sqrt[4]{128}\right)\left(\sqrt{6p}-\sqrt[4]{128}\right)=54+a\sqrt{2}$ $6p-\sqrt{128}=54+a\sqrt{2}$ $6p-8\sqrt{2}=54+a\sqrt{2}$ $\therefore 6p=54$ and $a=-8$ $p=9$ and $a=-8$ $a-p=-8-9$ $\therefore a-p=-17$	✓ expansion ✓ equating parts ✓ values ✓ answer (4)
		[23]

QUESTION/*VRAAG* 2

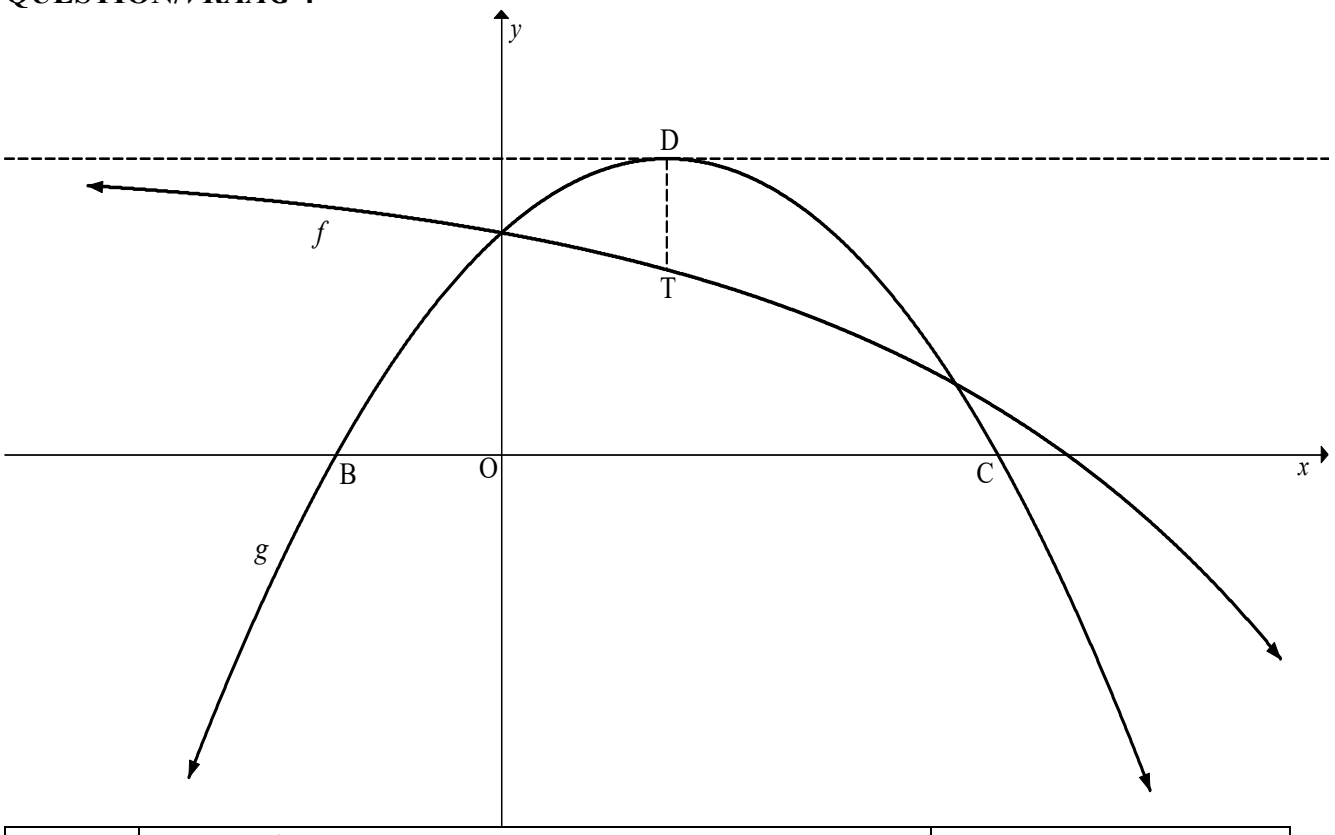
2.1.1	$6+(n-1)(4)=602$ $4n+2=602$ $4n=600$ $\therefore n=150$	✓ equating ✓ answer (2)
2.1.2	$S_n=\frac{n}{2}\left[2(6)+(n-1)(4)\right]$ $S_n=\frac{n}{2}\left[12+4n-4\right]$ $S_n=\frac{n}{2}\left[4n+8\right]$ $S_n=2n^2+4n$	✓ substitution ✓ simplification (2)
2.1.3	$S_{150}-S_{99}$ $=2(150)^2+4(150)-2(99)^2-4(99)$ $=25\ 602$ **OR/*OF*** $402+406+\ldots+602$ $S_{51}=\frac{51}{2}\left[402+602\right]$ or $S_{51}=\frac{51}{2}\left[2(402)+(51-1)(4)\right]$ $S_{51}=25\ 602$	✓ substitution ✓ answer (2) **OR/*OF*** ✓ substitution ✓ answer (2)
2.2.1	QP: -1 ; $-4x$; 11 ; $2x+12$; … FD: $-4x+1$ $11+4x$ $2x+1$ SD: $10+8x$ $-2x-10$ $10+8x=-2x-10$ $10x=-20$ $\therefore x=-2$	✓ first differences ✓ second differences ✓ equating ✓ answer (4)
2.2.2	-1 ; 8 ; 11 ; 8 ; … 9 3 -3 -6 -6 $2a=-6$ $3(-3)+b=9$ $-3+18+c=-1$ $a=-3$ $b=18$ $c=-16$ $\therefore T_n=-3n^2+18n-16$	✓ $2a=-6$ ✓ $3(-3)+b=9$ ✓ $-3+18+c=-1$ (3)

2.2.3	$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$ $\frac{n}{2}\left[2(9) + (n-1)(-6)\right] < -1\,380$ $n\left[18 - 6n + 6\right] < -2\,760$ $-6n^2 + 24n < -2\,760$ $-6n^2 + 24n + 2\,760 < 0$ $6n^2 - 24n - 2\,760 > 0$ $n^2 - 4n - 460 > 0$ $n > 23{,}54$ or $n < -19{,}54$ n.a From n = 24, the sum of the first differences will be smaller than – 1 380	✓ substitution in S_n ✓ standard form ✓ answer with selection ✓ answer (4)
		[17]

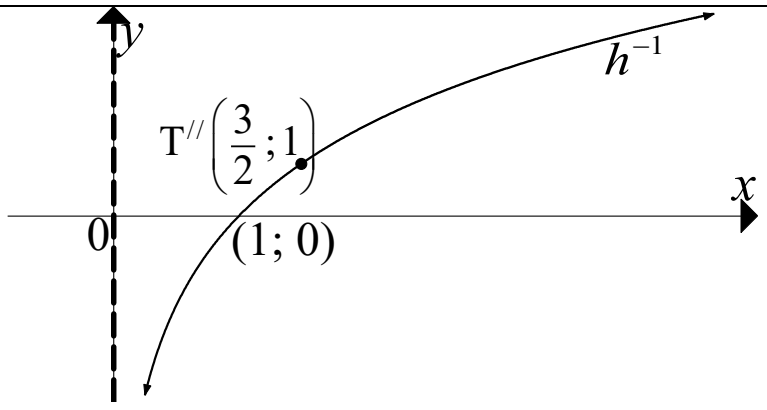
QUESTION/*VRAAG* 3

3.1	**Clock A:** 9:00 ; 9:05 ; 9:10 ; 9:15 **Clock B:** $9{:}00 \;;\; 9{:}00 + (2{,}5) \;;\; 9{:}00 + \left(\frac{1}{2}\right)(2{,}5) \;;\; 9{:}00 + \left(\frac{1}{2}\right)^2 (2{,}5)$ $S_{12} = \frac{\frac{5}{2}\left[\left(\frac{1}{2}\right)^{12} - 1\right]}{\frac{1}{2} - 1}$ $S_{12} = 4{,}998....$ $\therefore$ time on clock B will read 9:05	✓ $n = 12$ ✓ $a = 2{,}5 = \frac{5}{2}$ ✓ $r = 0{,}5 = \frac{1}{2}$ in S_n ✓ answer ✓ time on clock B (5)
3.2	$S_\infty = \frac{a}{1-r}$ $S_\infty = \frac{2{,}5}{1-0{,}5}$ $S_\infty = 5$ Clock B will never reach the time of 9:06 because the sum to infinity is 5.	✓ $S_\infty = 5$ ✓ Never reach 9:06 (2)
		[7]

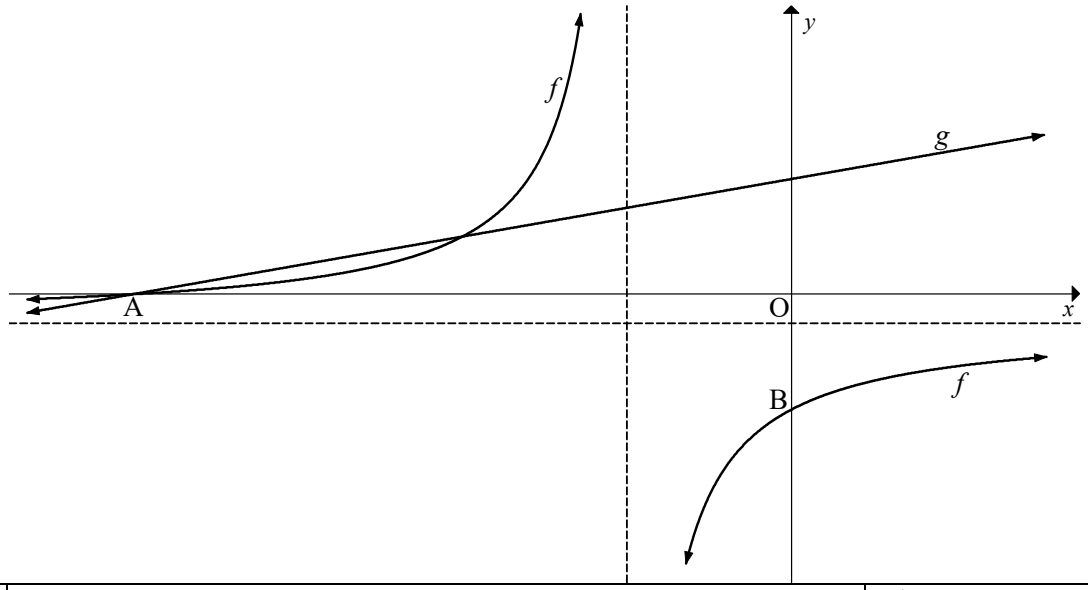
QUESTION/*VRAAG* 4



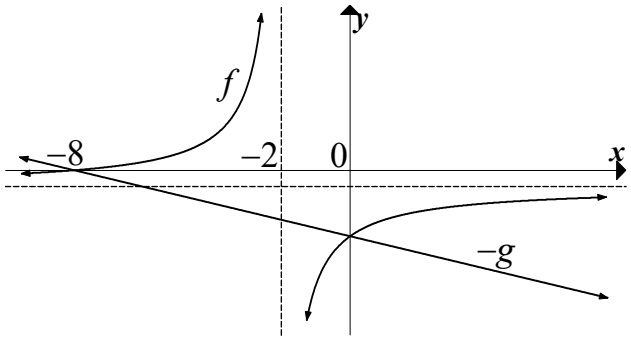
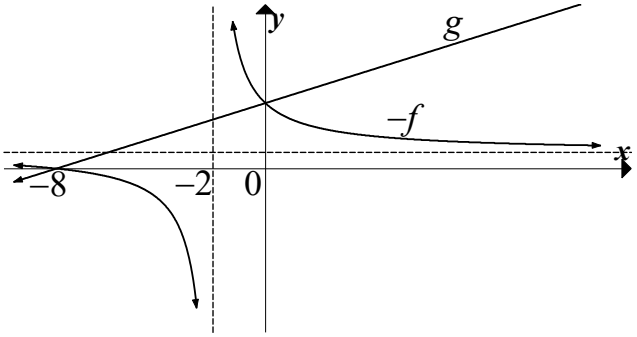
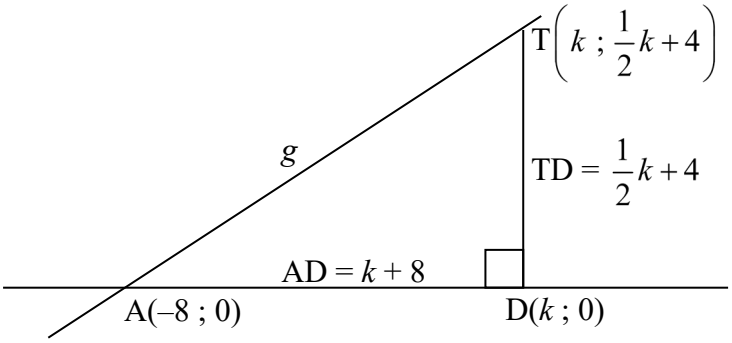
4.1	$g(x)=-x^2+2x+3$ $x=\frac{-b}{2a}=\frac{-2}{2(-1)}=1$ or $g(x)=-\left(x^2-2x\right)+3$ $g(x)=-\left(x^2-2x+1\right)+3+1$ $g(1)=-1^2+2(1)+3=4$ $g(x)=-(x-1)^2+4$ D(1 ; 4) **OR/*OF*** $g'(x)=-2x+2=0$ $2x=2$ $x=1$ $g(1)=-1^2+2(1)+3=4$ D(1 ; 4)	✓ method ✓ x-value ✓ y-value (3) **OR/*OF*** ✓ method ✓ x-value ✓ y-value (3)
4.2	$x<1$ **OR/*OF*** $x\in(-\infty;1)$	✓ answer (1)
4.3	$-x^2+2x+3=0$ $x^2-2x-3=0$ $(x-3)(x+1)=0$ $x=3$ or $x=-1$	✓ $=0$ ✓ $x=3$ ✓ $x=-1$ (3)
4.4	$3<k<4$ **OR/*OF*** $k\in(3;4)$	✓✓answer (2)
4.5	$y<4$ **OR/*OF*** $y\in(-\infty;4)$	✓answer (1)

4.6	DT = $\frac{3}{2}$ units T = $\left(1;\frac{5}{2}\right)$ $y=-a^x+4$ $\frac{5}{2}=-a^1+4$ $5=-2a+8$ $\frac{3}{2}=a$ $\therefore f(x)=-\left(\frac{3}{2}\right)^x+4$ **OR/*OF*** $y_g-y_f=\frac{3}{2}$ $4-\left(-a+4\right)=\frac{3}{2}$ $\therefore a=\frac{3}{2}$	✓ $\left(1;\frac{5}{2}\right)$ ✓ q ✓ substitute $\left(1;\frac{5}{2}\right)$ ✓ a (4) **OR/*OF*** ✓ $y_g-y_f=\frac{3}{2}$ ✓ q ✓ substitute: $4-\left(-a+4\right)$ ✓ a (4)
4.7	for every x-value there is a unique corresponding y – value **OR/*OF*** f is one to one relation	✓ answer (1) **OR/*OF*** ✓ answer (1)
4.8	$h(x)=-f(x)+4$ $h(x)=\left(\frac{3}{2}\right)^x$ $x=\left(\frac{3}{2}\right)^y$ $h^{-1}(x)=\log_{\frac{3}{2}}x$	✓ $h(x)=\left(\frac{3}{2}\right)^x$ ✓ swopping of x and y ✓ answer (3)
4.9		✓ x -intercept ✓ T// ✓ increasing log graph (3)
		[21]

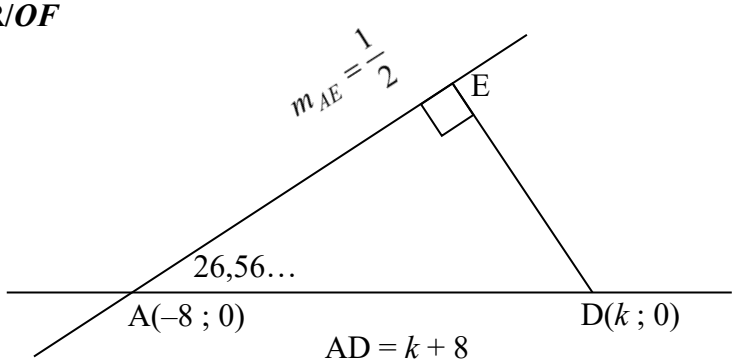
QUESTION/*VRAAG* 5



5.1	$x \neq -2\ ;\ x \in R$	✓ answer (1)
5.2.1	$\frac{-6}{0+2}-1=y$ $y=-4$ B(0 ; –4)	✓ answer (1)
5.2.2	$\frac{-6}{x+2}-1=0$ $-6=1(x+2)$ $\therefore x=-8$ A(–8 ; 0) **OR/*OF*** $\frac{1}{2}x+4=0$ $x=-8$ A(–8 ; 0)	✓ $y=0$ ✓ answer (2) **OR/*OF*** ✓ $y=0$ ✓ answer (2)
5.3	$y=x+c$ $-1=(-2)+c$ $c=1$ $\therefore y=x+1$	✓substitute ✓ answer (2)
5.4	$x+1=\frac{1}{2}x+4$ $\frac{1}{2}x=3$ $x=6$ The point is (6 ; 7)	✓equating ✓ x - value ✓ y - value (3)

5.5	Graphs of f and $-g$  Graphs of $-f$ and g  $f(x) \geq -g(x)$ $-8 \leq x < -2$ or $x \geq 0$ **OR/*OF*** $[-8\ ;-2)$ or $[0\ ;\infty)$	✓✓ first interval ✓ second interval (3)
5.6	 Area = $\frac{1}{2}$base × height $64=\frac{1}{2}(k+8)\left(\frac{1}{2}k+4\right)$ $\left(\frac{1}{2}k+4\right)^2=64$ or $k^2+6k-192=0$ $\frac{1}{2}k+4=\pm 8$ or $(k-8)(k+24)=0$ $k=8$ or $k=-24$	✓ base $(k+8)$ ✓ height $\left(\frac{1}{2}k+4\right)$ ✓ substitution into area formula ✓ answer (4)

OR/*OF*



$AD = k + 8$

$\tan E\hat{A}D = \frac{1}{2}$ $\quad E\hat{A}D = 26,56...°$

$\frac{AE}{AD} = \cos 26,57...°$ $\quad AE = (k+8)\cos 26,56...°$

$\text{area} = \frac{1}{2}AD.AE.\sin 26,56...°$

$64 = \frac{1}{2}(k+8).(k+8)\cos 26,56...°.\sin 26,56...°$

$(k+8)^2 = 320$

$k + 8 = \pm 8\sqrt{5}$

$k = -8 \pm 8\sqrt{5}$

✓ base $(k+8)$

✓ $AE = (k+8)\cos 26,56...°$

✓ substitution into area formula

✓ answer

(4)

[16]

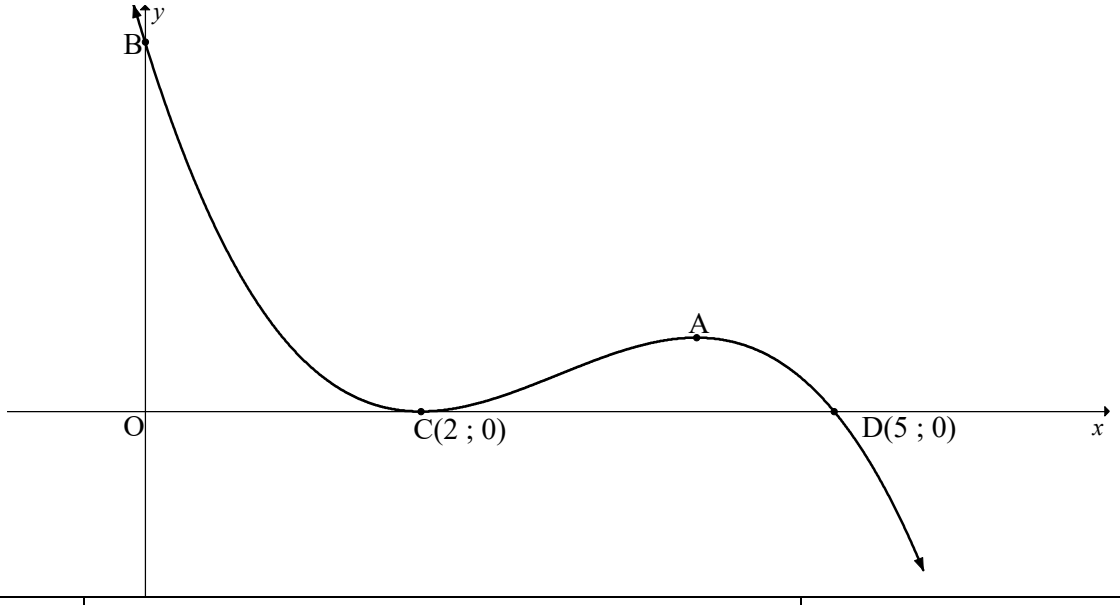
QUESTION/*VRAAG* 6

6.1	$A = P(1+i)^n$ $85\,000 = 75\,000\left(1+\frac{r}{200}\right)^{2\times 2}$ or $85\,000 = 75\,000\left(1+\frac{i}{2}\right)^{2\times 2}$ $\frac{17}{15} = \left(1+\frac{r}{200}\right)^4$ $\quad$ $\frac{17}{15} = \left(1+\frac{i}{2}\right)^4$ $\sqrt[4]{\frac{17}{15}} = 1+\frac{r}{200}$ $\quad$ $\sqrt[4]{\frac{17}{15}} = 1+\frac{i}{2}$ $0,03178... = \frac{r}{200}$ $\quad$ $0,03178... = \frac{i}{2}$ $r = 6,36\%$	✓ exponent = 4 ✓ substitution of A and P into the correct formula ✓answer (3)
6.2.1	$P = \frac{x\left[1-(1+i)^{-n}\right]}{i}$ $P = \frac{10\ 665\left[1-\left(1+\frac{0,115}{12}\right)^{-240}\right]}{\frac{0,115}{12}}$ $P = \text{R}1\ 000\ 065,985$ Deposit $= \frac{1\ 000\ 065,985}{9} = \text{R}111\ 118,44$	✓ $i = \frac{0,115}{12}$ ✓ $n = 240$ ✓substitute into correct formula ✓answer ✓answer (5)
6.2.2 (a)	$\text{P}_v = \text{House Price} - \text{deposit}$ $\text{P}_v = \text{R}1\,100\,000 - \text{R}120\,000 = \text{R}\ 980\ 000$ $\text{P}_v = \frac{x\left[1-(1+i)^{-n}\right]}{i}$ $980\,000 = \frac{11\,000\left[1-\left(1+\frac{0,115}{12}\right)^{-n}\right]}{\frac{0,115}{12}}$ $\frac{-193}{1320} = -\left(1+\frac{0,115}{12}\right)^{-n}$ $-n = \log_{\left(1+\frac{0,115}{12}\right)}\left(\frac{193}{1320}\right)$ $\therefore n = 201,59$ months $\therefore n = 16,80$ years (16 years and 10 months)	✓ Loan value ✓ substitute into correct formula ✓ simplification ✓ correct use of logs ✓ answer in years (5)
6.2.2 (b)	Amount paid = R 11 000 × 16 × 12 + R120 000 = R 2 232 000	✓ instalment × years × 12 ✓+ deposit ✓answer (3)
		[16]

QUESTION/*VRAAG* 7

7.1	$f'(x)=\lim\limits_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{(x+h)^2+2(x+h)-(x^2+2x)}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{x^2+2xh+h^2+2x+2h-x^2-2x}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{2xh+h^2+2h}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{h(2x+h+2)}{h}$ $f'(x)=\lim\limits_{h\to 0}(2x+h+2)$ $f'(x)=2x+2$	✓$f(x+h)$ ✓substitution ✓simplification ✓common factor ✓answer (5)
	OR/*OF* $f(x+h)=x^2+2xh+h^2+2x+2h$ $f(x+h)-f(x)=x^2+2xh+h^2+2x+2h-x^2-2x$ $=2xh+h^2+2h$ $f'(x)=\lim\limits_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{2xh+h^2+2h}{h}$ $f'(x)=\lim\limits_{h\to 0}\dfrac{h(2x+h+2)}{h}$ $f'(x)=\lim\limits_{h\to 0}(2x+h+2)$ $f'(x)=2x+2$	**OR/*OF*** ✓$f(x+h)$ ✓simplification ✓substitution ✓common factor ✓answer (5)
7.2.1	$f(x)=x^2-x-6$ $f'(x)=2x-1$	✓$2x$ ✓-1 (2)
7.2.2	$\dfrac{d}{dx}\left(\sqrt[3]{27x^4}+\dfrac{2}{x^3}\right)$ $\dfrac{d}{dx}\left(3x^{\frac{4}{3}}+2x^{-3}\right)$ $=4x^{\frac{1}{3}}-6x^{-4}$	✓$3x^{\frac{4}{3}}$ ✓$2x^{-3}$ ✓$4x^{\frac{1}{3}}$ ✓$-6x^{-4}$ (4)
7.3.1	$x=-2$ or $x=0$	✓ answers (1)
7.3.2	$x<-1$ **OR/*OF*** $x\in(-\infty;-1)$	✓-1 ✓$x<-1$ (2)
7.3.3	$x<1$ or $x>3$ **OR/*OF*** $x\in(-\infty;1)$ or $x\in(3;\infty)$	✓ answer ✓ answer (2)
		[16]

QUESTION/*VRAAG* 8

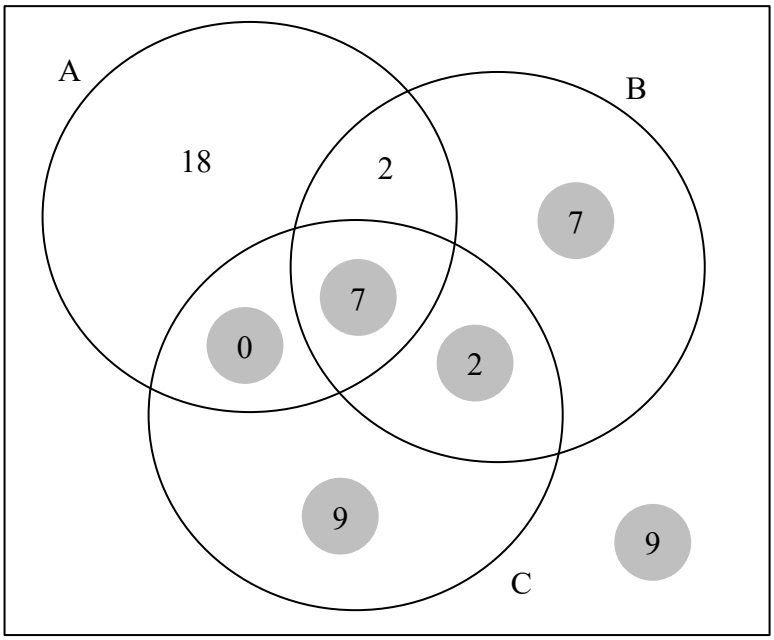


8.1	$h(x) = -1(x-2)^2(x-5)$ $h(x) = (-x^2+4x-4)(x-5)$ $h(x) = -x^3+9x^2-24x+20$ $\therefore p = 9$; $q = -24$; $r = 20$	✓ $(x-2)^2$ ✓ $(x-5)$ ✓ expansion (3)
8.2	B (0 ; 20) OB = 20 units	✓ OB = 20 (1)
8.3	$h'(x) = -3x^2+18x-24$ $h''(x) = -6x+18$ $-6x+18 = 0$ $-6x = -18$ $x = 3$ $\therefore$ point of inflection is (3;2)	✓ $-3x^2+18x-24$ ✓ $h''(x)$ ✓ value of x ✓ value of y (4)
8.4	$m = \tan 96{,}34°$ $m = -9$ $-9 = -3x^2+18x-24$ $x^2-6x+5 = 0$ $(x-5)(x-1) = 0$ $x = 5$ or $x = 1$ point of contact: (1 ; 4) $(4) = -9(1)+c$ **OR/*OF*** $y-4 = -9(x-1)$ $c = 13$ $\therefore y = -9x+13$ $\therefore y = -9x+13$	✓ $m = -9$ ✓ equating gradients ✓ answer for x ✓ $f(1) = 4$ ✓ answer (5)
		[13]

QUESTION/*VRAAG* 9

9.1	$C(0)=\frac{1}{1200}\left((0)^3-15(0)^2+1\,200\right)$ $C(0)=1$	✓ $t=0$ ✓ answer (2)
9.2	$C(t)=\frac{1}{1200}t^3-\frac{1}{80}t^2+1$ $C'(t)=\frac{1}{400}t^2-\frac{1}{40}t=0$ $t^2-10t=0$ $t(t-10)=0$ $t=0$ or/of $t=10$ $\therefore$ minimum is at $t=10$ days	✓ $C'(t)$ ✓ $=0$ ✓ answer (3)
9.3	$C''(t)=\frac{1}{200}t-\frac{1}{40}=0$ $t-5=0$ $\therefore t=5$ days **OR/*OF*** $t=\frac{10+0}{2}$ $t=5$ **OR/*OF*** Rate of change at the endpoint $t=15$ is the actual maximum on the domain $t\in[0\,;15]$	✓ $C''(t)$ ✓ answer (2) **OR/*OF*** ✓ method ✓ answer (2) **OR/*OF*** ✓✓ answer (2)
		[7]

QUESTION/*VRAAG* 10

10.1.1	$15 \times 4 \times 16 = 960$	✓$15 \times 4 \times 16$ (1)
10.1.2	$960 - 4 \times 4 \times 2 = 928$ **OR/*OF*** $(15)(4)(14)+(11)(4)(2)$ $=840+88$ $=928$	✓$4 \times 4 \times 2$ ✓answer (2) **OR/*OF*** ✓$(15)(4)(14)+(11)(4)(2)$ ✓answer (2)
10.1.3	P(only blue and black) $=\frac{6\times2\times3}{960}=\frac{3}{80}=0,0375$	✓$6 \times 2 \times 3$ ✓ ÷ by n(s) (2)
10.2.1	P(A and B) = P(A) × P(B) $\frac{9}{54}=\frac{x}{54}\times\frac{18}{54}$ Number of people who drink tea A = 27	✓ rule for independence ✓$\frac{9}{54}$ ✓ answer (3)
10.2.2		✓ only A and C = 0 ✓ A and B and C ✓ only B and C ✓ only B ✓ only C ✓ complement of A or B or C (6)
		[14]

TOTAL/*TOTAAL*: 150

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