GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

# PREPARATORY EXAMINATIONS
# *VOORBEREIDENDE EKSAMEN*
# 2023

# MARKING GUIDELINES/
# *NASIENRIGLYNE*

## TECHNICAL MATHEMATICS P1/*TEGNIESE WISKUNDE V1*
## (11091)

**18 pages/*bladsye***

| MARKING CODES/*NASIENKODES* | |
|---|---|
| **A** | Accuracy/*Akkuraatheid* |
| **CA** | Consistent accuracy/*Volgehoue akkuraatheid* |
| **M** | Method/*Metode* |
| **R** | Rounding/*Afronding* |
| **NPR** | No penalty for rounding/*Geen penalisering vir afronding nie* |
| **NPU** | No penalty for units omitted/*Geen penalisering vir eenhede weggelaat nie* |
| **S** | Simplification/*Vereenvoudiging* |
| **F** | Formula/F*ormule* |
| **SF** | Substitution in correct formula/*Vervanging in korrekte formule* |
| **AO** | Answer only/*Slegs antwoord* |

**NOTES:**
- If a candidate answers a question TWICE, only mark 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 where indicated.

***NOTAS:***
- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n poging om 'n vraag te beantwoord deurgehaal het en dit nie oorgedoen het nie, merk die deurgehaalde weergawe.*
- *Volgehoue akkuraatheid is deurgaans op alle aspekte van die nasienriglyne van toepassing, waar aangedui.*

**QUESTION/*VRAAG* 1**

| | | | | **CL/KV** |
|---|---|---|---|---|
| 1.1 | 1.1.1 | $x+3=2$<br>$x=-1$ | ✓$x+3=2$ A<br>✓ $x=-1$ A<br>(2) | 1E |
| | | | | |
| | 1.1.2 | $x^3-16x=0$<br>$x(x^2-16)=0$<br>$x=0$ or/*of* $x^2-16=0$<br>$(x-4)(x+4)=0$<br>$x=4$ or/*of* $x=-4$ | ✓ $x(x^2-16)$ A<br>✓ $x=0$ A<br>✓ $x=4$ CA<br>✓ $x=-4$ CA<br>(4) | 2M |
| | | | | |
| | 1.1.3 | $x^2=x+3$<br>$x^2-x-3=0$<br>$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$<br>$x=\frac{-(-1)\pm\sqrt{(-1)^2-4(1)(-3)}}{2(1)}$<br>$x=2{,}3$ or/*of* $x=-1{,}3$ | ✓ $x^2-x-3=0$ A<br>✓ SF CA<br>✓ $x=2{,}3$ CA<br>✓ $x=-1{,}3$ CA<br>(4)<br>AO:$\frac{2}{4}$<br>NPR | 1D |

| | | | | |
|---|---|---|---|---|
| | 1.1.4 | $-x-3 \geq x^2-5$<br>$0 \geq x^2+x-2$<br>$(x-1)(x+2) \leq 0$<br>$-2 \leq x \leq 1$ or/*of* $x\epsilon[-2;1]$<br><br>**OR/*OF***<br>$x+3 \leq -x^2+5$<br>$x^2+x-2 \leq 0$<br>$(x-1)(x+2) \leq 0$<br>$-2 \leq x \leq 1$ or/*of* $x\epsilon[-2;1]$ | ✓ $0 \geq x^2+x-2$ A<br>✓ $(x-1)(x+2)$ A<br>✓ End points/*Eindpunte* CA<br>✓ Notation/*Notasie* CA (4)<br><br>**OR/*OF***<br>✓ $0 \geq x^2+x-2$ A<br>✓ $(x-1)(x+2)$ A<br>✓ End points/*Eindpunte* CA<br>✓ Notation/*Notasie* CA (4)<br>AO: $\frac{2}{4}$ | 3E |
| | | | | |
| 1.2 | $2^y - 16^x = 0$ …… 1<br>$y = x^2+4x-4$ …… 2<br>$2^y = 16^x$<br>$2^y = 2^{4x}$<br>$y = 4x$ …… 3<br>Eq. 3=Eq. 2 or/*of Verg. 3=Verg. 2*<br>$x^2+4x-4 = 4x$<br>$x^2-4 = 0$<br>$(x-2)(x+2) = 0$<br>$x = 2$ or/*of* $x = -2$<br>If/*As* $x$ = 2 then/*dan* $y = 4(2) = 8$<br>If/*As* $x$ = - 2 then/*dan* $y = 4(-2) = -8$<br><br>**OR/*OF*** | ✓ $2^y = 2^{4x}$ A<br>✓ $y = 4x$ A<br><br>✓$x^2+2x+4 = 4x$ A<br><br>✓ $(x-2)(x+2)$ CA<br>✓ $x = 2$ and/*en* $x = -2$ CA<br>✓ $y = 8$ and/*en* $y = -8$ CA (6)<br><br>**OR/*OF*** | 3M |

| | | | |
|---|---|---|---|
| | $2^y - 16^x = 0$ ..... 1<br>$y = x^2 + 4x - 4$ ..... 2<br>$2^y = 16^x$<br>$2^y = 2^{4x}$<br>$y = 4x$<br>$x = \frac{y}{4}$ ..... 3<br>Eq. 3 into Eq. 2 or/*of Verg. 3 in Verg. 2*<br>$y = \left(\frac{y}{4}\right)^2 + 4\left(\frac{y}{4}\right) - 4$<br>$\frac{y^2}{16} = 6$<br>$y^2 = 64$<br>$y = \pm 8$<br>$x = \frac{8}{4} = 2$<br>$x = -\frac{8}{4} = -2$ | ✓ $2^y = 2^{4x}$ A<br>✓ $x = \frac{y}{4}$ A<br>✓ $y = \left(\frac{y}{4}\right)^2 + 4\left(\frac{y}{4}\right) - 4$ A<br>✓ $y^2 = 64$ CA<br>✓ $y = 8$ and/*en* $y = -8$ CA<br>✓ $x = 2$ and/*en* $x = -2$ CA<br>(6) | |
| | | | |
| 1.3 | $x = 2_{10} = 10_2$<br>$y = 8_{10} = 1000_2$ | ✓$10_2$ CA<br>✓$1000_2$ CA<br>(2)<br>**P: 1 if one or more of the base numbers 2 is omitted.**<br>***P: 1 indien een of meer van die basis 2 uitgelaat word.*** | 1E |
| | | | |
| 1.4 | 1.4.1 $KE = \frac{1}{2}mv^2$<br>$2KE = mv^2$<br>$\frac{2KE}{m} = v^2$<br>$\sqrt{\frac{2KE}{m}} = v$<br>**OR/*OF*** | ✓ $2KE = mv^2$ M<br>✓ $\frac{2KE}{m} = v^2$ M<br>✓ $\sqrt{\frac{2KE}{m}} = v$ A<br>**OR/*OF*** | 2M |

| | | | | |
|---|---|---|---|---|
| | | $\text{KE} = \frac{1}{2}mv^2$<br>$\frac{\text{KE}}{\frac{1}{2}} = mv^2$<br>$\frac{\text{KE}}{\frac{1}{2}m} = v^2$<br>$v = \sqrt{\frac{\text{KE}}{\frac{1}{2}m}}$ | ✓ $\frac{\text{KE}}{\frac{1}{2}} = mv^2$ M<br>✓ $\frac{\text{KE}}{\frac{1}{2}m} = v^2$ M<br>✓ $v = \sqrt{\frac{\text{KE}}{\frac{1}{2}m}}$ A<br>(3) | |
| | | | | |
| | 1.4.2 | $\sqrt{\frac{2\text{KE}}{m}} = v$<br>$\sqrt{\frac{2(411{,}675)}{55}} = v$<br>$v = 3{,}869108424$<br>$v = 3{,}9\ m/s$<br>**OR/*OF***<br>$v = \sqrt{\frac{\text{KE}}{\frac{1}{2}m}}$<br>$v = \sqrt{\frac{411{,}675}{\frac{1}{2}(55)}}$<br>$v = 3{,}869108424$<br>$v = 3{,}9\ m/s$<br>**OR/*OF*** | ✓ SF CA<br>✓ $v = 3{,}9\ m/s$ CA<br>**OR/*OF***<br>✓ SF CA<br>✓ $v = 3{,}9\ m/s$ CA<br>**OR/*OF*** | 1M |

| | | | | |
|---|---|---|---|---|
| | | $\text{KE} = \frac{1}{2}mv^2$<br>$411{,}675 = \frac{1}{2}(55)v^2$<br>$411{,}675 = 27{,}5v^2$<br>$v^2 = 14{,}97$<br>$v = \sqrt{14{,}97}$<br>$v = 3{,}9\ m/s$ | ✓ SF CA<br>✓ $v = 3{,}9\ m/s$ CA<br>(2)<br>PR | |
| | | | **[27]** | |

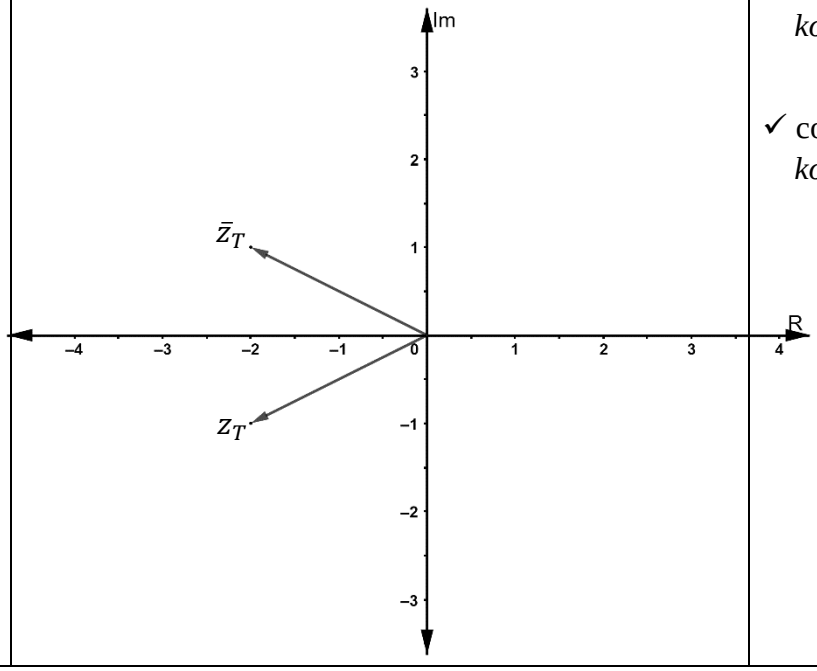
**QUESTION/*VRAAG* 2**

| | | | **CL/ *KV*** |
|---|---|---|---|
| 2.1 | $3x^2 - 5x + 1 = 0$<br>$\Delta = b^2 - 4ac$<br>$\Delta = (-5)^2 - 4(3)(1)$<br>$\Delta = 13$<br>Roots are real, unequal, and irrational.<br>*Wortels is reël, ongelyk en irrasionaal.* | ✓ $\Delta = 13$ A<br>✓ Conclusion/*Gevolgtrekking* CA<br>(2) | 3E |
| | | | |
| 2.2 | $x^2 + (k+2)x + 3k = 2$<br>$x^2 + (k+2)x + 3k - 2 = 0$<br>$\Delta = b^2 - 4ac$<br>$= (k+2)^2 - 4(1)(3k-2)$<br>$= k^2 + 4k + 4 - 12k + 8$<br>$\therefore \Delta = k^2 - 8k + 12$<br>**For real roots/*Vir reële wortels*: $\Delta > 0$**<br>$(k-6)(k-2) > 0$<br>$k < 2$ OR/*OF* $k > 6$ | ✓ Equation in standard form/ *Vergelyking in standaard vorm*<br>$x^2 + (k+2)x + 3k - 2 = 0$ A<br>✓ $\Delta = k^2 - 8k + 12$ A<br>✓ $(k-6)(k-2) > 0$ CA<br>✓ $k < 2$ OR/*OF* CA<br>✓ $k > 6$ CA<br>(5) | 4M |
| | | **[7]** | |

**QUESTION/*VRAAG* 3**

| | | | | | **CL/ *KV*** |
|---|---|---|---|---|---|
| 3.1 | 3.1.1 | $3\log 20 - \log 4 - \log 2$<br>$= 3\,[\log(2 \times 10)] - 2\log 2 - \log 2$<br>$= 3(\log 2 + \log 10) - 3\log 2$<br>$= 3(\log 2 + 1) - 3\log 2$<br>$= 3\log 2 + 3 - 3\log 2$<br>$= 3$<br>**OR / OF**<br>$3\log 20 - \log 4 - \log 2$<br>$= \log 8000 - \log 4 - \log 2$<br>$= \log\left(\frac{8000}{4 \times 2}\right)$<br>$= \log 1000$<br>$= 3$ | ✓ $2\log 2$<br>✓ $3\,(\log 2 + \log 10)$<br>✓ $\log 10 = 1$<br>✓ 3<br>(4)<br>**OR / OF**<br>✓ $\log 8000$<br>✓$\log\left(\frac{8000}{4\times 2}\right)$<br>✓ $\log 1000$<br>✓ 3<br>(4)<br>AO: $\frac{1}{4}$ | A<br>A<br>A<br>CA<br><br><br>A<br>A<br>A<br>CA | 2M |
| | | | | | |
| | 3.1.2 | $\frac{2i^8-3i^7+4i^6}{5i^9}$<br>$= \frac{2i^8}{5i^9} - \frac{3i^7}{5i^9} + \frac{4i^6}{5i^9}$<br>$= \frac{2}{5i} - \frac{3}{5i^2} + \frac{4}{5i^3}$<br>$= \frac{2}{5i} \times \frac{i}{i} - \frac{3}{5(-1)} + \frac{4}{5i(-1)}$<br>$= \frac{2i}{-5} + \frac{3}{5} - \frac{4}{5i} \times \frac{i}{i}$<br>$= -\frac{2}{5}i + \frac{3}{5} - \frac{4i}{5(-1)}$<br>$= -\frac{2}{5}i + \frac{3}{5} + \frac{4}{5}i$<br>$= \frac{3}{5} + \frac{2}{5}i$<br>**OR / OF** | ✓ $\frac{2}{5i} - \frac{3}{5i^2} + \frac{4}{5i^3}$<br>✓ $\frac{2}{5i} \times \frac{i}{i} - \frac{3}{5(-1)} + \frac{4}{5i(-1)}$<br>✓ $\times \frac{i}{i}$<br>✓ $i^2 = -1$<br>✓ $\frac{3}{5} + \frac{2}{5}i$<br>(5)<br>**OR / OF** | M<br>S<br>CA<br>A<br>CA | 2D |

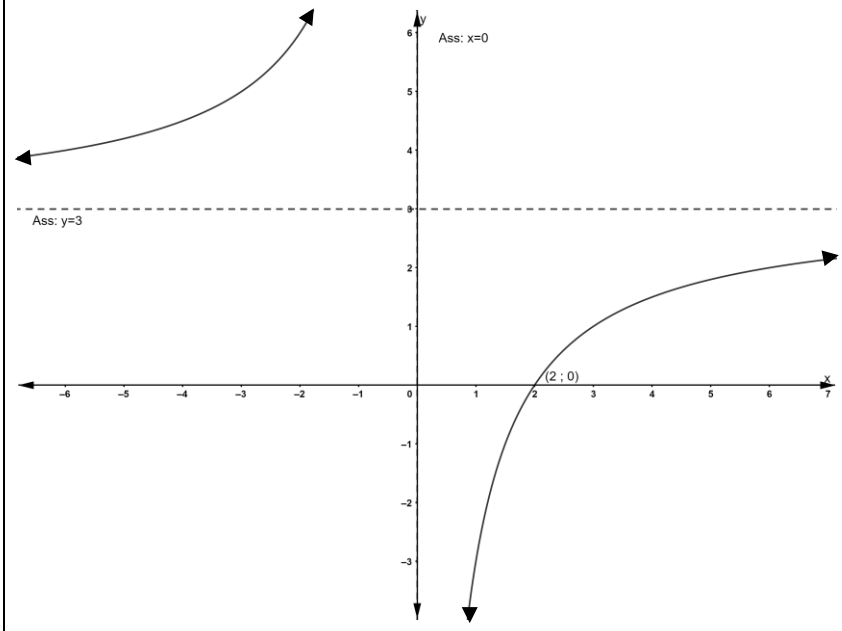
| | | | | |
|---|---|---|---|---|
| | | $\frac{2i^8-3i^7+4i^6}{5i^9}$<br>$= \frac{i^6(2i^2-3i+4)}{5\,i^6.i^3}$<br>$= \frac{2i^2-3i+4}{5i^2.i}$<br>$= \frac{2(-1)-3i+4}{5(-1).i}$<br>$= \frac{-2-3i+4}{-5\,i}$<br>$= \frac{2-3i}{-5i}$<br>$= \frac{2-3i}{-5i} \times \frac{i}{i}$<br>$= \frac{2i-3i^2}{-5i^2}$<br>$= \frac{2i+3}{5}$<br>$= \frac{3}{5}+\frac{2}{5}i$ | ✓ $\frac{2(-1)-3i+4}{5(-1).i}$ M<br>✓ $\frac{-2-3i+4}{-5i}$ S<br>✓ $\times \frac{i}{i}$ CA<br>✓ $i^2 = -1$ A<br>✓ $\frac{3}{5}+\frac{2}{5}i$ CA<br>(5) | |
| | | **OR/*OF*** | **OR/*OF*** | |
| | | $= \frac{2(i^2)^4-3\,(i^2)^3 i+4(i^2)^3}{5(i^2)^4 i}$<br>$= \frac{2(-1)^4-3\,(-1)^3 i+4(-1)^3}{5(-1)^4 i}$<br>$= \frac{2+3i-4}{5i}$<br>$= \frac{-2+3i}{5i}$<br>$= \frac{-2+3i}{5i} \times \frac{i}{i}$<br>$= \frac{-2i+3i^2}{5i^2}$<br>$= \frac{-2i+3(-1)}{5(-1)}$<br>$= \frac{-2i}{-5} + \left(\frac{-3}{-5}\right)$<br>$= \frac{3}{5}+\frac{2}{5}i$ | ✓ $\frac{2(i^2)^4-3\,(i^2)^3 i+4(i^2)^3}{5(i^2)^4 i}$ M<br>✓$i^2 = -1$ A<br>✓$\times \frac{i}{i}$ CA<br>✓ $\frac{-2i+3(-1)}{5(-1)}$ CA<br>✓ $\frac{3}{5}+\frac{2}{5}i$ CA<br>(5) | |

| | | | | |
|---|---|---|---|---|
| | 3.1.3 | $\frac{\sqrt{75}-\sqrt{27}}{\sqrt{48}}$<br>$=\frac{\sqrt{3\times25}-\sqrt{3\times9}}{\sqrt{3\times16}}$<br>$=\frac{5\sqrt{3}-3\sqrt{3}}{4\sqrt{3}}$<br>$=\frac{2\sqrt{3}}{4\sqrt{3}}$<br>$=\frac{1}{2}$ | ✓ $\frac{5\sqrt{3}-3\sqrt{3}}{4\sqrt{3}}$ A<br>✓ $\frac{2\sqrt{3}}{4\sqrt{3}}$ A<br>✓ $\frac{1}{2}$ CA<br>(3)<br>AO: 1 mark/*punt* | 2E |
| | | | | |
| 3.2 | 3.2.1 | $z_T = -2 - i$ | ✓ $-2$ A<br>✓ $-i$ A<br>(2)<br>AO | 2E |
| | | | | |
| | 3.2.2 | $\bar{z}_T = -2 + i$ | ✓ $\bar{z}_T = -2 + i$ CA<br>(1) | 1E |
| | 3.2.3 |  | ✓ correct quadrant of $\bar{z}_t$<br>*korrekte kwadrant van* $\bar{z}_t$ CA<br>✓ correct quadrant of $z_t$<br>*korrekte kwadrant van* $z_t$ CA<br>(2) | 1D |
| | | | **[17]** | |

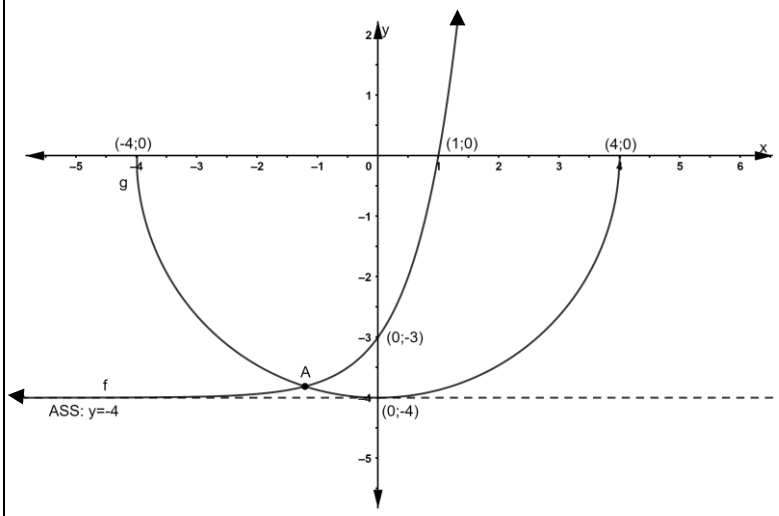
**QUESTION/*VRAAG* 4**

| | | | | | **CL/*KV*** |
|---|---|---|---|---|---|
| 4.1 | 4.1.1 | $\text{EF} = 5 - (-7) = 5 + 7 = 12$ | ✓M<br>✓ $\text{EF} = 12$ | A<br>A<br>(2)<br>**AO: $\frac{2}{2}$** | 1E |
| | | | | | |
| | 4.1.2 | For coordinate of/*Vir koördinaat van* D:<br>D $(2\ ;\ -3)$<br>For coordinate of/*Vir koördinaat van* C:<br>$f(x) = -x^2 + 7x - 7$<br>$f'(x) = -2x + 7$<br>$0 = -2x + 7$<br>$2x = 7$<br>$x = \frac{7}{2}$<br>$f\left(\frac{7}{2}\right) = \frac{21}{4}$<br>$\therefore C\ \left(\frac{7}{2}\ ;\ \frac{21}{4}\right)$ | ✓ 2<br>✓ $-3$<br>✓ M<br>✓ $x = \frac{7}{2}$<br>✓ $y = \frac{21}{4}$ | A<br>A<br>A<br>A<br>CA<br>(5) | 2D |

| | | | | |
|---|---|---|---|---|
| | | **OR/*OF*** | **OR/*OF*** | |
| | | For coordinate of/*Vir koördinaat van* D:<br>D $(2\ ;\ -3)$<br>For coordinate of/*Vir koördinaat van* C:<br>$x = -\frac{b}{2a} = -\frac{7}{2(-1)} = \frac{7}{2}$<br>MAX./$MAKS. = -\frac{\Delta}{4a} = \frac{-[49-4(-1)(-7)]}{4(-1)} = \frac{21}{4}$<br>$\therefore$ C$\left(\frac{7}{2};\frac{21}{4}\right)$<br>ACCEPT/*AANVAAR*:<br>$\left(3\frac{1}{2};5\frac{1}{4}\right)$ **OR/*OF*** (3,5; 5,25) | ✓ 2 A<br>✓ $-3$ A<br>✓ $x = -\frac{b}{2a}$ M<br>✓ $\frac{7}{2}$ A<br>✓ $y = \frac{21}{4}$ CA<br>(5) | |
| | | | | |
| | 4.1.3 | $g(x) = 2x^2 - 8x + 5$<br>$g\left(\frac{5}{2}\right) = 2\left(\frac{5}{2}\right)^2 - 8\left(\frac{5}{2}\right) + 5$<br>$g\left(\frac{5}{2}\right) = -\frac{5}{2}$<br>$Q\left(\frac{5}{2}\ ;\ -\frac{5}{2}\right)$<br>**ACCEPT/*AANVAAR*:**<br>$x = \frac{5}{2}$ and/*en* $y = -\frac{5}{2}$<br>$x = 2\frac{1}{2} = 2{,}5$ and/*en* $y = -2\frac{1}{2} = -2{,}5$ | ✓ $x = \frac{5}{2}$ A<br>✓ $g\left(\frac{5}{2}\right) = -\frac{5}{2}$ A✓<br>$Q\left(\frac{5}{2}\ ;\ -\frac{5}{2}\right)$ CA<br>(3)<br>**AO** | 4E |

| | | | |
|---|---|---|---|
| 4.2 |  | ✓Asymptotes/ *Asimptote* A<br>✓ Correct quadrants/ *korrekte kwadrante* A<br>✓ Correct $x$ – int *korrekte x – afsn* A<br>(3) | 4M |
| | | **[13]** | |

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|---|---|---|---|---|
| **QUESTION/*VRAAG* 5** | | | | |
| | | | | |
| 5.1 | Exponential/*Eksponensieël* | | ✓ Answer/*Antwoord* A<br>(1) | 1E |
| | | | | |
| 5.2 | 5.2.1 | $f(x) = 4^x - 4$<br>$0 = 4^x - 4$<br>$4 = 4^x$<br>$x = 1$ | ✓ $f(x) = 0$ A<br>✓ $4 = 4^x$ M<br>✓ $x = 1$ CA<br>(3) | 2E |
| | | | | |
| | 5.2.2 | $f(x) = 4^x - 4$<br>$f(x) = 4^0 - 4$<br>$f(x) = -3$ | ✓ $x = 0$ A<br>✓ $y = -3$ CA<br>(2) | 2E |
| | | | | |
| 5.3 | $y = -4$ | | ✓ $y = -4$ A<br>(1) | 1E |

| | | | |
|---|---|---|---|
| 5.4 |  | **For graph of *f*/**<br>***Vir grafiek van f:***<br>✓ *x*-intercepts<br>*x-afsnitte* CA<br>✓ *y*-intercept<br>*y-afsnit* CA<br>✓ Asymptote/*Asimptote* A<br>✓ Shape/*Vorm* A<br>**For graph of *g*/**<br>***Vir grafiek van g*:**<br>✓ *x*-int./*afsn.* A<br>✓ *y*-int./*afsn.* A<br>✓ Shape/*Vorm* A<br>(7) | 2E |
| | | | |
| 5.5 | Indicated on the graph/*Aangedui op grafiek* | ✓ Indicating A/<br>*Dui A aan* CA<br>(1) | 1E |
| | | | |
| 5.6 | $h(x) = 4^x - 4 + 5$<br>$h(x) = 4^x + 1$ | ✓$h(x) = 4^x + 1$ A<br>(1) | 4E |
| | | | |
| 5.7 | $-4 \leq y \leq 0$ **OR/*OF*** $y \in [-4; 0]$ | ✓ both *y* values/<br>*beide y waardes* A<br>✓ inequalities/<br>*ongelykhede* A<br>(2) | 4E |
| | | **[18]** | |

**QUESTION/*VRAAG* 6**

| | | | | **CL/*KV*** |
|---|---|---|---|---|
| 6.1 | $i_{eff} = \left(1 + \frac{i}{m}\right)^m - 1$<br>$= \left(1 + \frac{0{,}072}{2}\right)^2 - 1$<br>$= 0{,}073296$<br>$i = 7{,}33\%$ | | ✓ F A<br>✓ $m = 2$ A<br>✓ 0,0732 ... CA<br>✓ 7,33 CA<br>(4)<br>NPR | 2E |
| | | | | |
| 6.2 | 6.2.1 | $A = P(1+i)^n$<br>$= 3\,400\left(1 + \frac{0{,}092}{365}\right)^{365}$<br>$= 3\,727{,}597$<br>$= R3\,728$ | ✓ F A<br>✓ SF A<br>✓ $\frac{0{,}092}{365}$ A<br>✓ R3 728 CA<br>(4)<br>NPR | 2E |
| | | | | |
| | 6.2.2 | No, it is not a fair interest rate./<br>*Nee, dit is nie 'n billike rentekoers nie.*<br><br>**OR/*OF***<br><br>Yes, Gomolemo only pays R328 in interest without the need to go to a bank.<br>*Ja, Gomolemo betaal net R328 aan rente sonder dat dit nodig is om na 'n bank toe te gaan.* | ✓ ST<br><br>✓ RE<br>(Yes/No must correlate to learner's reason).<br>*(Ja/Nee moet ooreenstem met die leerder se rede)*<br>Statement only $\frac{0}{2}$<br>*Slegs stelling* $\frac{0}{2}$<br>*(2)* | 4E |

| | | | |
|---|---|---|---|
| 6.3 | $A = P(1+I)^n$<br>$= 20\,000\left(1+\frac{0{,}125}{12}\right)^{2\times12}$<br>$= 25\,647{,}32204$<br>$A = P(1+i)^n$<br>$= 25\,647{,}32204\left(1+\frac{0{,}098}{4}\right)^{4\times4}$<br>$=$ R37 777,52<br>**OR/*OF***<br>$A = 20\,000\left(1+\frac{\frac{12{,}5}{100}}{12}\right)^{24}.\left(1+\frac{\frac{9{,}8}{100}}{4}\right)^{16}$<br>$A =$ R37 777,52 | ✓ $\frac{0{,}125}{12}$ A<br>✓ $2\times12$ A<br>✓ 25 647,32 CA<br>✓ SF CA<br>✓ 37 777,52 CA<br>(5)<br>**OR/*OF***<br>✓ $\frac{0{,}125}{12}$ A<br>✓ 24 A<br>✓ $\frac{\frac{9{,}8}{100}}{4}$ A<br>✓ 16 A<br>✓ 37 777,52 CA<br>(5)<br>**NPR** | 3E |
| | | **[15]** | |

**QUESTION/*VRAAG* 7**

| | | | **CL/*KV*** |
|---|---|---|---|
| 7.1 | $f(x) = 5-\ 3x$<br>$f(x+h) = 5-3(x+h)$<br>$f(x+h) = 5-3x-3h$<br>$f'(x) = \lim_{h\to0}\frac{f(x+h)-f(x)}{h}$<br>$f'(x) = \lim_{h\to0}\frac{5-\ 3x-3h-(5-3x)}{h}$<br>$f'(x) = \lim_{h\to0}\frac{5-\ 3x\ -\ 3h\ -5+3x}{h}$<br>$f'(x) = \lim_{h\to0}\frac{-3h}{h}$<br>$f'(x) = -3$ | ✓ Definition/*Definisie* A<br>✓ SF CA<br>✓ S $\frac{-3h}{h}$ CA<br>✓ $-3$ CA<br>(4)<br>AO: $\frac{0}{4}$ | 2M |

| | | | | |
|---|---|---|---|---|
| 7.2 | 7.2.1 | $\lim\limits_{x\to-2}\dfrac{x^2+3x+2}{x+2}$<br>$=\lim\limits_{x\to-2}\dfrac{(x+2)(x+1)}{x+2}$<br>$=\lim\limits_{x\to-2}(x+1)$<br>$=-2+1$<br>$=-1$ | ✓ $(x+2)(x+1)$ A<br>✓ $(x+1)$ S A<br>✓ $-2+1$ CA<br>✓ $-1$ CA<br>(4) | 2D |
| | | | | |
| | 7.2.2 | $\dfrac{d}{dx}[(x^2+1)(x^{-2}-1)]$<br>$=\dfrac{d}{dx}(1-x^2+x^{-2}-1)$<br>$=\dfrac{d}{dx}(-x^2+x^{-2})$<br>$=-2x-2x^{-3}$<br>$=-2x-\frac{2}{x^3}$ | ✓ 1 or/*of* $x^0$ A<br>✓ $-x^2+x^{-2}$ A<br>✓ $-2x$ CA<br>✓ $-\frac{2}{x^3}$ CA<br>(4) | 3E |
| | | | | |
| 7.3 | $g(x)=4x-x^2$<br>$g'(x)=4-2x$<br>$m=g'(3)=4-2(3)=4-6=-2$<br>$g(3)=4(3)-(3)^2=12-9=3$ $(3;3)$<br>$y=mx+c$<br>$y=-2x+c$<br>$3=-2(3)+c$<br>$3=-6+c$<br>$9=c$<br>$y=-2x+9$ | ✓ $4-2x$ A<br>✓ $-2$ CA<br>✓ $3$ CA<br>✓ SF CA<br>✓ $y=-2x+9$ CA<br>(5) | 3E |
| | | | **[17]** | |

**QUESTION/*VRAAG* 8**

| | | | | **CL/*KV*** |
|---|---|---|---|---|
| 8.1 | $x-1$ | ✓ $x-1$ | A<br>(1) | 1E |
| | | | | |
| 8.2 | D$(0\,;37)$<br>**ACCEPT / AANVAAR: $x=0$ and/en $y=37$** | ✓ $(0\,;37)$ | A<br>(1) | 1E |
| | | | | |
| 8.3 | $f(x)=2x^3-3x^2-36x+37$<br>$f'(x)=6x^2-6x-36$<br>$6x^2-6x-36=0$<br>$x^2-x-6=0$<br>$(x+2)(x-3)=0$<br>$x=-2$ or/*of* $x=3$<br>$f(-2)=81$<br>B$(-2\,;81)$ | ✓$f'(x)$<br>✓ $f'(x)=0$<br>✓ factors/*faktore*<br>✓ both $x$-values<br>*beide x-waardes*<br>✓ B$(-2\,;81)$ | A<br>A<br>CA<br>CA<br>CA<br>(5) | 3E |
| | | | | |
| 8.4 | $-2<x<3$<br>**OR/*OF***<br>$x\in(-2\,;3)$ | ✓ Notation/*Notasie*<br>✓ Endpoints/*Eindpunte* | A<br>CA<br>(2) | 4E |
| | | | | |
| 8.5 | $f'(x)=6x^2-6x-36$<br>$f'(-1)=-24$<br>C$(-1;68)$<br>$y-y_c=m(x-x_c)$<br>$y-68=-24\,(x+1)$<br>Therefor the equation of the tangent is given by:/<br>*Dus is die vergelyking van die raaklyn:*<br>$y=-24\,x+44$ | ✓ $m=-24$<br>(-24 has to be calculated / -24 moet bereken word)<br>✓ SF $x=-1$<br>✓ SF $y=68$ | CA<br><br>A<br>A<br>(3) | 4M |
| | | | **[12]** | |

**QUESTION/*VRAAG* 9**

| | | | | **CL/*KV*** |
|---|---|---|---|---|
| 9.1 | $P = 2x + 2y + \frac{2\pi r}{2}$<br>$6 = 2x + 2y + \pi r$<br>$2y = 6 - 2x - \pi r$<br>$y = 3 - x - \frac{\pi r}{2}$ | ✓ M<br><br>✓ S | A<br><br>A<br><br>(2) | 3E |
| | | | | |
| 9.2 | $L(x) = \frac{lb}{2} + \frac{\pi r^2}{2}$<br>$L(x) = \frac{y.2x}{2} + \frac{\pi r^2}{2}$<br>$L(x) = xy + \frac{\pi r^2}{2}$<br>$L(x) = x\left(3 - x - \frac{\pi x}{2}\right) + \frac{\pi x^2}{2}$<br>$L(x) = 3x - x^2 - \frac{\pi x^2}{2} + \frac{\pi x^2}{2}$<br>$L(x) = 3x - x^2$ | ✓ M<br>✓ SF<br>✓ $r = x$<br>✓ S<br>✓ S | A<br>A<br>A<br>A<br>A<br>(5) | 3D |
| | | | | |
| 9.3 | $L(x) = 3x - x^2$<br>$L'(x) = 3 - 2x$<br>$0 = 3 - 2x$<br>$2x = 3$<br>$x = \frac{3}{2}$<br>$y = 3 - \frac{3}{2} - \frac{\pi r}{2}$<br>$y = \frac{3}{2} - \frac{\pi\left(\frac{3}{2}\right)}{2}$<br>$y = \frac{3}{2} - \frac{3}{4}\pi$ | ✓ $0 = 3 - 2x$<br>✓ $x = \frac{3}{2}$<br>✓ $y = \frac{3}{2} - \frac{3}{4}\pi$ | A<br>CA<br>CA<br>(3) | 3E |

| | | | |
|---|---|---|---|
| 9.4 | $L(x) = 3x - x^2$<br>$L\left(\frac{3}{2}\right) = 3\left(\frac{3}{2}\right) - \left(\frac{3}{2}\right)^2$<br>$L\left(\frac{3}{2}\right) = \frac{9}{2} - \frac{9}{4}$<br>$L\left(\frac{3}{2}\right) = \frac{18-9}{4} = \frac{9}{4}$<br>**ACCEPT/*AANVAAR*:**<br>$2\frac{1}{4}$ or/*of* 2,25 | ✓ SF CA<br>✓ $L\left(\frac{3}{2}\right) = \frac{9}{4}$ CA<br>(2) | 3M |
| | | **[12]** | |

**QUESTION/*VRAAG* 10**

| | | | | |
|---|---|---|---|---|
| | | | | **CL/*KV*** |
| 10.1 | 10.1.1 | $\int(4 + 2^{3x})\,dx$<br>$= 4x + \frac{2^{3x}}{3ln2} + C$ | ✓ $4x$ A<br>✓ $\frac{2^{3x}}{3ln2}$ A<br>✓ C A<br>(3) | 2M |
| | | | | |
| | 10.1.2 | $\int\left(\sqrt{x} + 6x^2 - \frac{8}{x}\right)dx$<br>$\int\left(x^{\frac{1}{2}} + 6x^2 - \frac{8}{x}\right)dx$<br>$= \frac{2}{3}x^{\frac{3}{2}} + 2x^3 - 8lnx + C$ | ✓ $x^{\frac{1}{2}}$ A<br>✓ $\frac{2}{3}x^{\frac{3}{2}}$ A<br>✓ $2x^3$ CA<br>✓ $-8lnx + c$ CA<br>(4) | 2D |
| | | | | |
| 10.2 | A/*Opp* $= \int_1^4(-x^3 + 6x^2)dx$<br>A/*Opp* $= [-\frac{1}{4}x^4 + 2x^3]_1^4$<br>A/*Opp* $= \left[-\frac{1}{4}(4)^4 + 2(4)^3\right] - \left[-\frac{1}{4}(1)^4 + 2(1)^3\right]$<br>A/*Opp* $= 64 - \frac{7}{4}$<br>A/*Opp* $= 62\frac{1}{4}\ unit^2$ **which is less than $62\frac{1}{2}$ sq. units./**<br>$eenheid^2$ ***wat minder as $62\frac{1}{2}$ eenhede is.*** | ✓ F A<br>✓ M A<br>✓ SF CA<br>✓ S CA<br>✓ $62\frac{1}{4}$ CA<br>(5) | 3M |
| | | **[12]** | | |
| | | | | |
| | | **TOTAL/*TOTAAL*:** | **150** | |