education

Department of Education
FREE STATE PROVINCE

GRADE 11/GRAAD 11



MATHEMATICS/WISKUNDE

MARCH 2022

MARKING GUIDELINE/NASIENRIGLYN

MARKS: 50
PUNTE: 50

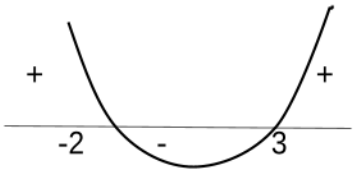
These marking guidelines consists of 6 pages.
Hierdie nasienriglyne bestaan uit 6 bladsye.

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

LET WEL:
- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.

QUESTION/VRAAG 1

1.1.1	$x = 2$ or $x = -7$	✓ $x = 2$ ✓ $x = -7$ (2)
1.1.2	$5x^2 - 3x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(5)(-1)}}{2(5)}$ $= \frac{3 \pm \sqrt{29}}{10}$ $= 0.84$ or $x = -0.24$	✓ standard form ✓ correct formulae ???? ✓ subst into the correct formula ✓ both answers (4)
1.1.3	$(x-3)(x+2) < 0$ C.V $x = 3$ or $x = -2$  $-2 < x < 3$	✓ factors ✓ critical values ✓ answer (3)

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1.1.4	$2^x + 2^x.2^1 = 48$ $2^x(1+2) = 48$ $2^x = 16$ $2^x = 2^4$ $\therefore x = 4$	✓ expansion ✓ common factor ✓ simplification ✓ answer (4)
1.1.5	$(\sqrt{2x-1})^2 = (x-2)^2$ $2x-1 = x^2-4x+4$ $x^2-6x+5=0$ $(x-5)(x-1)=0$ $x=5$ or $x\neq 1$	✓squaring both sides ✓standard form ✓factors ✓answer with selection (4)
1.2	$x = 2y-6$ $(2y-6)^2 + 2y(2y-6) = 3y^2$ $4y^2-24y+36+4y^2-12y-3y^2=0$ $5y^2-36y+36=0$ $(5y-6)(y-6)=0$ $y=\frac{6}{5}$ or $y=6$ $x=2\left(\frac{6}{5}\right)-6$ or $x=2(6)-6$ $=-\frac{18}{5}$ $=6$	✓ x = 2y-6 ✓subst ✓simplification ✓factors ✓both y values ✓ both x values (6)

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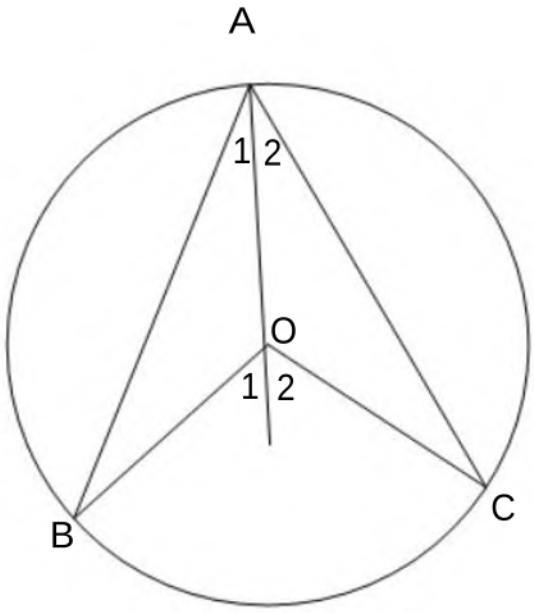
Question 2

2.1.1	$\frac{3^{2(x+1)}-6.3^{2x}}{\left(3^{\frac{1}{2}}\right)^{4x+1}}$ $=\frac{3^{2x+2}-6.3^{2x}}{3^{2x+\frac{1}{2}}}$ $=\frac{3^{2x}(3^2-6)}{3^{2x}\left(3^{\frac{1}{2}}\right)}$ $=\frac{3}{3^{\frac{1}{2}}}$ $=3^{\frac{1}{2}}=\sqrt{3}$	✓prime factors ✓simplification ✓common factor ✓answer (4)
2.1.2	$=\frac{2\sqrt{x^8x}-4\sqrt{x^8x}}{\sqrt{x}}$ $=\frac{2x^4\sqrt{x}-4x^4\sqrt{x}}{\sqrt{x}}$ $=\frac{-2x^4\sqrt{x}}{\sqrt{x}}$ $=-2x^4$	✓ $\frac{2\sqrt{x^8x}-4\sqrt{x^8x}}{\sqrt{x}}$ ✓ $\frac{2x^4\sqrt{x}-4x^4\sqrt{x}}{\sqrt{x}}$ ✓ $\frac{-2x^4\sqrt{x}}{\sqrt{x}}$ ✓answer (4)
2.2	$1=kx^2-kx+k$ $0=kx^2-kx+k-1$ $\Delta=0$ $b^2-4ac=0$	✓standard form

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	$(-k)^2-4(k)(k-1)=0$ $k^2-4k^2+4k=0$ $-3k^2+4k=0$ $k(-3k+4)=0$ $k=0$ or $k=\frac{4}{3}$ $\therefore \Delta>0$ $0<k<\frac{4}{3}$	✓correct subt ✓factors ✓ $\Delta>0$ ✓answer (5)

Question 3

3.1.1	Supplementary or sum up to 180°	✓answer
3.2	 Join AO In ΔAOB	✓Construction Join AO

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	$\hat{O}_1 = \hat{A}_1 + \hat{B}$ ext $\angle$ of Δ But $\hat{A}_1 = \hat{B}$ =radii(OA=OB) $\therefore \hat{O}_1 = 2\hat{A}_1$ Similarly in ΔAOC $\hat{O}_2 = \hat{A}_2 + \hat{C}$ ext $\angle$ of Δ But $\hat{A}_2 = \hat{C}$ $\therefore \hat{O}_2 = 2\hat{A}_2$ $\therefore \hat{O}_1 + \hat{O}_2 = 2\hat{A}_1 + 2\hat{A}_2$ $B\hat{O}C = 2(\hat{A}_1 + \hat{A}_2)$ $\therefore B\hat{O}C = 2 \times B\hat{A}C$	✓S/R ✓S ✓S ✓S (5)
3.3.1	$C\hat{O}B = 2(51^\circ) = 102^\circ$ $\angle$at the$\sqcup$ $= 2 \times \angle$at circum	✓S ✓R
3.3.2	$\hat{A}_2 = 39^\circ$ $\angle$in $\frac{1}{2}\sqcup$	✓S ✓R
3.3.3	$\hat{D} = 180^\circ - (90^\circ + 29^\circ) = 61^\circ$ sum of $\angle$ in Δ	✓S/R
3.3.4	In $\Delta C\hat{O}B$ CF= $\frac{1}{2}(24)$ line from centre to midpoint $OC^2 = CF^2 + OF^2$ pyth theorem $13^2 = 12^2 + OF^2$ $OF^2 = 169 - 144$ $OF^2 = 25$ OF=5m	✓S/R ✓Subst into pyt ✓answer

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