KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS

PROVINCIAL STANDARDISED ASSESSMENT

MARKING GUIDELINES

MARCH 2026

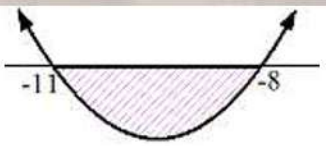
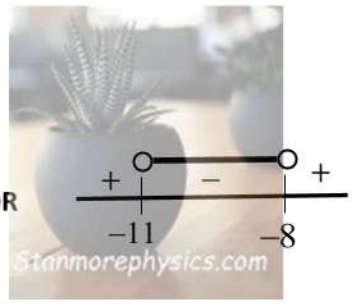
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MARKS: 75

These marking guidelines consist of 10 pages.

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QUESTION 1

1.1.1	$(x+1)(2x-6)=0$ $x=-1$ or $x=3$	✓A answer ✓A answer (2)
1.1.2	$3x^2+8x=4$ $3x^2+8x-4=0$ $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\dfrac{-(8)\pm\sqrt{(8)^2-4(3)(-4)}}{2(3)}$ $x=-3{,}10$ or $x=0{,}43$ **NOTE: penalty of 1 mark for incorrect rounding.**	✓A standard form ✓CA correct subst. into quadratic formula ✓CA answer ✓CA answer (4)
1.1.3	$x^2+19x+88<0$ $(x+11)(x+8)<0$ CVs: $x=-11$ or $x=-8$  **OR**  $\therefore -11<x<-8$ **OR** $x\in(-11\,;-8)$	✓A correct factors ✓CA critical values (accept if shown on a sketch or number line) ✓CA✓CA answer (4)
1.1.4	$\sqrt{36-5x^2}-2x=0$ $\sqrt{36-5x^2}=2x$ $\left(\sqrt{36-5x^2}\right)^2=(2x)^2$ $36-5x^2=4x^2$ $36=9x^2$ $9x^2-36=0$ $x^2-4=0$ $(x+2)(x-2)=0$ **OR** $x^2=4$ $x\neq-2$ or $x=2$ **OR** $x\neq-2$ or $x=2$	✓A isolation of surd ✓CA squaring both sides ✓CA standard form ✓CA answer with selection (4)

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1.1.5	$\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^2-6x+8}$ $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{(x-2)(x-4)}$ $\frac{x(x-4)+1(x-2)=2}{(x-2)(x-4)}$ $x^2-4x+x-2=2$ $x^2-3x-4=0$ $(x+1)(x-4)=0$ $x=-1$ or $x\neq 4$ **Award mark for standard form only if it is a quadratic equation** **OR** $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^2-6x+8}$ $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{(x-2)(x-4)}$ $\frac{x(x-4)+1(x-2)}{(x-2)(x-4)}=\frac{2}{(x-2)(x-4)}$ $\frac{x^2-4x+x-2}{(x-2)(x-4)}=\frac{2}{(x-2)(x-4)}$ $\frac{x^2-3x-2}{(x-2)(x-4)}=\frac{2}{(x-2)(x-4)}$ $\therefore x^2-3x-2=2$ $x^2-3x-4=0$ $(x+1)(x-4)=0$ $x=-1$ or $x\neq 4$ **Award mark for standard form only if it is a quadratic equation**	✓A factoring denominator on RHS ✓A writing as a single fraction ✓CA simplification ✓CA standard form ✓CA both x-values ✓CA valid answer (6) **OR** ✓A factoring denominator on RHS ✓A LCD on LHS ✓CA equating numerators ✓CA standard form ✓CA both x-values ✓CA valid answer (6)
1.2	$2x+y=3$ $y=3-2x$.....equ.(3) $x^2-y^2=-x-y$ $x^2-(3-2x)^2=-x-(3-2x)$ $x^2-(9-12x+4x^2)=-x-3+2x$ $x^2-9+12x-4x^2=x-3$ $-3x^2+11x-6=0$ $3x^2-11x+6=0$ **B/D if standard form is NOT quadratic** $(3x-2)(x-3)=0$ $x=\frac{2}{3}$ or $x=3$ $y=\frac{5}{3}$ or $y=-3$	✓A expressing y in terms of x ✓CA substitution ✓CA simplification (after removing all brackets) ✓CA standard form ✓CA values of x ✓CA values of y (6)

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	OR $2x+y=3$ $x=\dfrac{3-y}{2}$ .....equ.(3) $x^2-y^2=-x-y$ $\left(\dfrac{3-y}{2}\right)^2-y^2=-\left(\dfrac{3-y}{2}\right)-y$ $\dfrac{9-6y+y^2}{4}-y^2=-\left(\dfrac{3-y}{2}\right)-y$ $9-6y+y^2-4y^2=-2(3-y)-4y$ $9-6y+y^2-4y^2=-6+2y-4y$ $-3y^2-6y+9=-2y+6$ $3y^2+4y-15=0$ **B/D if standard form is NOT quadratic** $(3y-5)(y+3)=0$ $y=\dfrac{5}{3}$ or $y=-3$ $x=\dfrac{3-\left(\frac{5}{3}\right)}{2}$ or $x=\dfrac{3-(-3)}{2}$ $x=\dfrac{2}{3}$ or $x=3$	✓A expressing x in terms of y ✓CA substitution ✓CA simplification (after removing all brackets) ✓CA standard form ✓CA values of y ✓CA values of x (6)
1.3	$36-24m\geq 0$ $-24m\geq -36$ $m\leq \dfrac{3}{2}$	✓A $36-24m\geq 0$ ✓CA answers (2)
		[28]

QUESTION 2

2.1.1	$\sqrt[3]{0,125x^9}$ $=\sqrt[3]{\frac{125}{1000}x^9}$ $=\sqrt[3]{\frac{1}{8}x^9}$ $=\sqrt[3]{\left(\frac{1}{2}x^3\right)^3}$ $=\left[\left(\frac{1}{2}x^3\right)^3\right]^{\frac{1}{3}}$ $=\frac{1}{2}x^3$ **Answer only, award 0 marks** **OR** $\sqrt[3]{0,125x^9}$ $=\sqrt[3]{(0,5)^3x^9}$ $=\sqrt[3]{(0,5x^3)^3}$ $=0,5x^3$ **Answer only, award 0 marks**	✓A writing 0,125 as $\frac{125}{1000}$ ✓A applying exponent / surd law ✓CA answer (3) **OR** ✓A rewriting 0,125 as $(0,5)^3$ ✓A applying exponent / surd law ✓CA answer (3)
2.1.2	$\frac{6^{p+2}.10^{p-2}}{4^p.15^{p+1}}$ $=\frac{(3\times2)^{p+2}.(5\times2)^{p-2}}{(2^2)^p.(5\times3)^{p+1}}$ $=\frac{3^{p+2}.2^{p+2}.5^{p-2}.2^{p-2}}{2^{2p}.5^{p+1}.3^{p+1}}$ $=3^{p+2-p-1}.2^{p+2+p-2-2p}.5^{p-2-p-1}$ $=3^1.2^0.5^{-3}$ $=\frac{3}{5^3}$ $=\frac{3}{125}$	✓A rewriting as prime bases ✓A applying the law of exponents ✓CA simplification ✓CA answer (4)

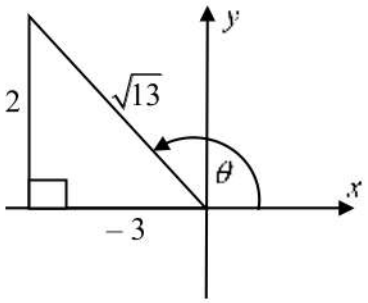
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2.1.3	$\frac{18}{\sqrt{2}}-\sqrt{18}-2\sqrt{2}$ $=\frac{18}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}-\sqrt{9\times2}-2\sqrt{2}$ $=\frac{18\sqrt{2}}{2}-3\sqrt{2}-2\sqrt{2}$ $=9\sqrt{2}-5\sqrt{2}$ $=4\sqrt{2}$ **Answer only, award 0 marks** **OR** $\frac{18}{\sqrt{2}}-\sqrt{18}-2\sqrt{2}$ $=\frac{18}{\sqrt{2}}-\sqrt{9\times2}-2\sqrt{2}$ $=\frac{18}{\sqrt{2}}-3\sqrt{2}-2\sqrt{2}$ $=\frac{18}{\sqrt{2}}-5\sqrt{2}$ $=\frac{18-10}{\sqrt{2}}$ $=\frac{8}{\sqrt{2}}$ **Answer only, award 0 marks**	✓A rationalising denomin. i.e. $\times\frac{\sqrt{2}}{\sqrt{2}}$ ✓A $3\sqrt{2}$ ✓CA answer (3) **OR** ✓A $3\sqrt{2}$ ✓A LCD ✓CA answer (3)
2.2.1	$2^{-3x}=32$ $2^{-3x}=2^5$ $-3x=5$ $x=-\frac{5}{3}$ **OR** $x=-1\frac{2}{3}$ **OR** $2^{-3x}=32$ $\frac{1}{2^{3x}}=\frac{1}{2^{-5}}$ $3x=-5$ $x=-\frac{5}{3}$ **OR** $x=-1\frac{2}{3}$	✓A $32=2^5$ ✓A answer (2) **OR** ✓A $\frac{1}{2^{3x}}=\frac{1}{2^{-5}}$ ✓A answer (2)

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2.2.2	$\frac{27}{9^x}-12.3^{-x}+1=0$ $\frac{27}{3^{2x}}-\frac{12}{3^x}+1=0$ $27-12.3^x+1.3^{2x}=0$ $3^{2x}-12.3^x+27=0 \quad \text{OR} \quad k^2-12k+27=0$ $(3^x-9)(3^x-3)=0 \quad \text{OR} \quad (k-9)(k-3)=0$ $3^x-9=0 \text{ or } 3^x-3=0$ $3^x=3^2 \text{ or } 3^x=3^1$ $x=2 \text{ or } x=1$ **OR** $\frac{27}{9^x}-12.3^{-x}+1=0$ $\frac{27}{3^{2x}}-12.3^{-x}+1=0$ $27.3^{-2x}-12.3^{-x}+1=0 \quad \text{OR} \quad 27k^2-12k+1=0$ $(9.3^{-x}-1)(3.3^{-x}-1)=0 \quad \text{OR} \quad (9k-1)(3k-1)=0$ $9.3^{-x}-1=0 \text{ or } 3.3^{-x}-1=0$ $3^{-x}=\frac{1}{9} \text{ or } 3^{-x}=\frac{1}{3}$ $3^{-x}=3^{-2} \text{ or } 3^{-x}=3^{-1}$ $x=2 \text{ or } x=1$	✓A $9^x=3^{2x}$ ✓A correct standard form ✓CA factors ✓CA both equations with base 3 ✓A both answers (5) ✓A $9^x=3^{2x}$ ✓A correct standard form ✓CA factors ✓CA both equations with base 3 ✓A both answers (5)
		[17]

QUESTION 3

3.1.1	$3\tan\theta+2=0$ $\tan\theta=-\frac{2}{3}$  $r^2=x^2+y^2$ $=(-3)^2+(2)^2$ $=13$ $r=\sqrt{13}$ $\cos\theta=-\frac{3}{\sqrt{13}}$	✓A $\tan\theta=-\frac{2}{3}$ ✓A diagram in the correct quadrant ✓A $r=\sqrt{13}$ ✓CA answer (4)
3.1.2	$13\cos^2\theta-\sqrt{13}\sin\theta=13\left(-\frac{3}{\sqrt{13}}\right)^2-\sqrt{13}\left(\frac{2}{\sqrt{13}}\right)$ $=13\left(\frac{9}{13}\right)-2$ $=7$	✓CA substitution ✓CA simplification ✓CA answer (3)

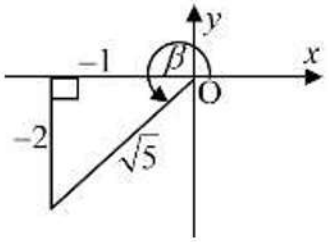
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3.2	$\frac{\cos(360°-x).\tan(-x).\cos(90°+x)}{\sin(x+720°)}$ $=\frac{(\cos x)(-\tan x)(-\sin x)}{(\sin x)}$ $=\frac{\frac{\cos x}{1}.\frac{\sin x}{\cos x}.\frac{\sin x}{1}}{\sin x}$ $=\sin x$	✓A $\cos(360°-x)=\cos x$ ✓A $\tan(-x)=-\tan x$ ✓A $\cos(90°+x)=-\sin x$ ✓A $\sin(x+270°)=\sin x$ ✓ A $\tan x=\frac{\sin x}{\cos x}$ ✓CA answer (6)
3.3	$\frac{\tan 120°.\sin 115°}{\cos 240°.\cos 205°}$ $=\frac{(-\tan 60°)(\sin 65°)}{(-\cos 60°)(-\cos 25°)}$ $=-\frac{\sqrt{3}(\sin 65°)}{\frac{1}{2}(\sin 65°)}$ **OR** $-\frac{\sqrt{3}(\cos 25°)}{\frac{1}{2}(\cos 25°)}$ $=-2\sqrt{3}$	✓A $\tan 120°=-\tan 60°$ ✓A $\sin 115°=\sin 65°$ ✓A $\cos 240°=-\cos 60°$ ✓A $\cos 205°=-\cos 25°$ ✓ CA special angles ✓ CA co-ratio ✓CA answer (7)
3.4.1	$\text{LHS}=\frac{1}{\tan x}(\cos x+\tan x.\sin x)$ $=\frac{\cos x}{\sin x}\left(\frac{\cos x}{1}+\frac{\sin x}{\cos x}.\frac{\sin x}{1}\right)$ $=\frac{\cos^2 x}{\sin x}+\frac{\sin x}{1}$ $=\frac{\cos^2 x+\sin^2 x}{\sin x}$ $=\frac{1}{\sin x}$ $=\text{RHS}$ **OR**	✓A $\tan x=\frac{\sin x}{\cos x}$ ✓ A removing brackets ✓A writing as a single fraction ✓ A $\cos^2 x+\sin^2 x=1$ (4) **OR**

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	$\text{LHS} = \frac{1}{\tan x}(\cos x + \tan x.\sin x)$ $= \frac{\cos x}{\tan x} + \frac{\sin x}{1}$ $= \frac{\cos x}{1} \div \frac{\sin x}{\cos x} + \frac{\sin x}{1}$ $= \frac{\cos x}{1} \times \frac{\cos x}{\sin x} + \frac{\sin x}{1}$ $= \frac{\cos^2 x + \sin^2 x}{\sin x}$ $= \frac{1}{\sin x}$ $= \text{RHS}$	✓ A removing brackets ✓A $\tan x = \frac{\sin x}{\cos x}$ ✓A writing as a single fraction ✓ A $\cos^2 x + \sin^2 x = 1$ (4)
3.4.2	(i) If: $\sin x = 0$ $\therefore x = 0°$ or $x = 180°$ and (ii) If: $\tan x$ is undefined $\therefore x = 90°$ or $x = 270°$	✓A $0°$ and $180°$ ✓A $90°$ and $270°$ (2)
3.5	$\cos\beta = k$ and $\sin\beta = 2k$ $\sin^2\beta + \cos^2\beta = 1$ $(2k)^2 + (k)^2 = (1)^2$ $4k^2 + k^2 = 1$ $5k^2 = 1$ $k^2 = \frac{1}{5}$ $\therefore k = -\sqrt{\frac{1}{5}}$ **OR**	✓A $\sin^2\beta + \cos^2\beta = 1$ ✓A substitution ✓A $k^2 = \frac{1}{5}$ ✓A $k = -\sqrt{\frac{1}{5}}$ (4) **OR**

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	$\cos\beta = k$ and $\sin\beta = 2k$ $\sin\beta = 2\cos\beta$ $\tan\beta = \frac{2}{1}$ $\therefore x = -1$ and $y = -2$ $r^2 = x^2 + y^2$ $= (-1)^2 + (-2)^2$ $= 5$ $r = \sqrt{5}$ $k = \cos\beta$ $\therefore k = -\frac{1}{\sqrt{5}}$ or $-\frac{\sqrt{5}}{5}$ **OR** $2k = \sin\beta$ $2k = -\frac{2}{\sqrt{5}}$ $k = -\frac{1}{\sqrt{5}}$ or $-\frac{\sqrt{5}}{5}$  	✓A $\sin\beta = 2\cos\beta$ ✓A $\tan\beta = \frac{2}{1}$ ✓A diagram in the correct quadrant ✓A $k = -\frac{1}{\sqrt{5}}$ or $-\frac{\sqrt{5}}{5}$ (4)
		[30]

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TOTAL MARKS: 75

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