KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS
PROVINCIAL STANDARDISED ASSESSMENT
MARCH 2026

MARKS: 75

TIME: 1½ hours

This question paper consists of 4 pages and an answer book of 8 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions and information carefully before answering the questions.

1. This question paper consists of 3 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1

1.1 Solve for x:

1.1.1 $(x+1)(2x-6)=0$ (2)

1.1.2 $3x^2+8x=4$ (correct to TWO decimal places) (4)

1.1.3 $x^2+19x+88<0$ (4)

1.1.4 $\sqrt{36-5x^2}-2x=0$ (4)

1.1.5 $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^2-6x+8}$ (6)

1.2 Solve for x and y simultaneously:

$2x+y=3$ and $x^2-y^2=-x-y$. (6)

1.3 The roots of a quadratic equation are $x=\frac{6\pm\sqrt{36-24m}}{4}$.

Calculate the values of m for which the roots of the equation will be real. (2)

[28]

QUESTION 2

2.1 Simplify fully, WITHOUT using a calculator:

2.1.1 $\sqrt[3]{0,125x^9}$ (3)

2.1.2 $\frac{6^{p+2}.10^{p-2}}{4^p.15^{p+1}}$ (4)

2.1.3 $\frac{18}{\sqrt{2}}-\sqrt{18}-2\sqrt{2}$ (3)

2.2 Solve for x, WITHOUT using a calculator:

2.2.1 $2^{-3x}=32$ (2)

2.2.2 $\frac{27}{9^x}-12.3^{-x}+1=0$ (5)

[17]

QUESTION 3

3.1 If $3\tan\theta+2=0$ and $\sin\theta>0$, evaluate the following with the use of a diagram and **without using a calculator**:

3.1.1 $\cos\theta$ (4)

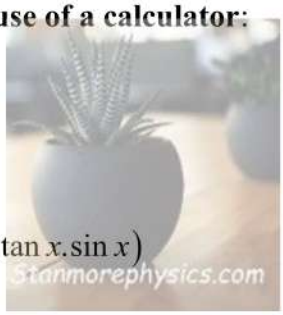
3.1.2 $13\cos^2\theta-\sqrt{13}\sin\theta$ (3)

3.2 Simplify the following expression to a single term:

$$\frac{\cos(360°-x).\tan(-x).\cos(90°+x)}{\sin(x+720°)}.$$ (6)

3.3 Evaluate **without the use of a calculator**:

$$\frac{\tan 120°.\sin 115°}{\cos 240°.\cos 205°}.$$ (7)

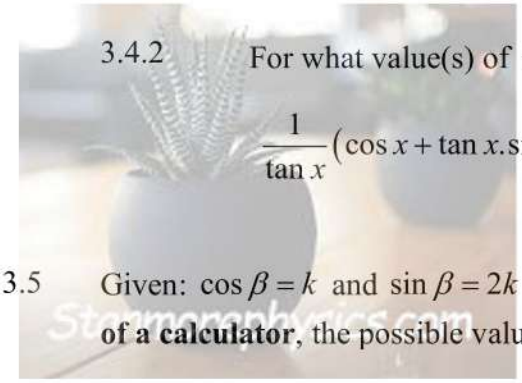


3.4 Given: $\frac{1}{\tan x}(\cos x+\tan x.\sin x)$

3.4.1 Prove that $\frac{1}{\tan x}(\cos x+\tan x.\sin x)=\frac{1}{\sin x}$ (4)

3.4.2 For what value(s) of x in the interval $x\in[0°;360°)$ is

$\frac{1}{\tan x}(\cos x+\tan x.\sin x)$ undefined? (2)



3.5 Given: $\cos\beta=k$ and $\sin\beta=2k$ for $\beta\in[180°\ ;\ 270°]$. Calculate, **without the use of a calculator**, the possible value(s) of k, leaving your answer in surd form. (4)

[30]

KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 11

MATHEMATICS

PROVINCIAL STANDARDISED ASSESSMENT

MARCH 2026

SPECIAL ANSWER BOOK

Name and Surname:

Marks: 75

Time: 1½ hours

Question	Marks	
1		
2		
3		
TOTAL		

N.B. This answer book consists of 8 pages.

QUESTION 1

	Solution	Marks
1.1.1		(2)
1.1.2		(4)
1.1.3		(4)
1.1.4		(4)

	Solution	Marks
1.1.5		(6)
1.2		(6)
1.3		(2)
		[28]

QUESTION 2

	Solution	Marks
2.1.1		(3)
2.1.2		(4)
2.1.3		(3)

2.2.1		(2)
2.2.2		(5)
		[17]

QUESTION 3

	Solution	Marks
3.1.1		(4)
3.1.2		(3)
3.2		(6)

3.3		(7)
3.4.1		(4)
3.4.2		(2)
3.5		(4)
		[30]

	Additional space	

FINAL

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NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS

PROVINCIAL STANDARDISED ASSESSMENT

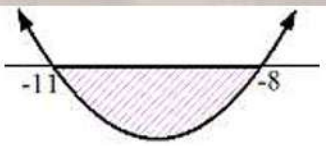
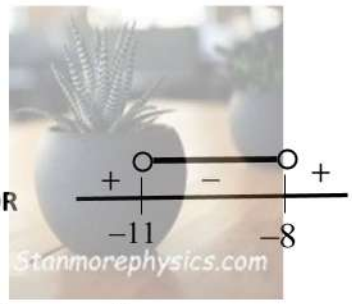
MARKING GUIDELINES

MARCH 2026

MARKS: 75

These marking guidelines consist of 10 pages.

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)

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)

	OR $2x+y=3$ $x=\frac{3-y}{2}$ .....equ.(3) $x^2-y^2=-x-y$ $\left(\frac{3-y}{2}\right)^2-y^2=-\left(\frac{3-y}{2}\right)-y$ $\frac{9-6y+y^2}{4}-y^2=-\left(\frac{3-y}{2}\right)-y$ $9-6y+y^2-4y^2=-2(3-y)-4y$ $9-6y+y^2-4y^2=-6+2y-4y$ $-3y^2-6y+9=-2y+6$ $3y^2+4y-15=0$ **B/D if standard form is NOT quadratic** $(3y-5)(y+3)=0$ $y=\frac{5}{3}$ or $y=-3$ $x=\frac{3-\left(\frac{5}{3}\right)}{2}$ or $x=\frac{3-(-3)}{2}$ $x=\frac{2}{3}$ 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	$36-24m\geq 0$ $-24m\geq -36$ $m\leq\frac{3}{2}$	✓A $36-24m\geq 0$ ✓CA answers (2)
		[28]

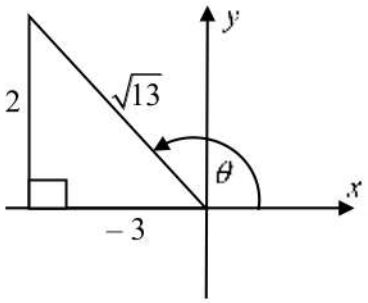
QUESTION 2

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)

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)

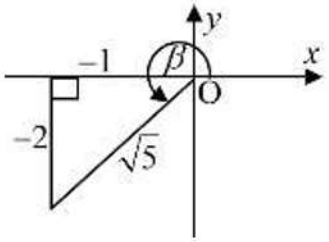
2.2.2	$\frac{27}{9^x}-12.3^{-x}+1=0$ $\frac{27}{3^{2x}}-\frac{12}{3^x}+1=0$ $27-12.3^x+1.3^{2x}=0$ $3^{2x}-12.3^x+27=0 \quad \text{OR} \quad k^2-12k+27=0$ $(3^x-9)(3^x-3)=0 \quad \text{OR} \quad (k-9)(k-3)=0$ $3^x-9=0 \text{ or } 3^x-3=0$ $3^x=3^2 \text{ or } 3^x=3^1$ $x=2 \text{ or } x=1$ **OR** $\frac{27}{9^x}-12.3^{-x}+1=0$ $\frac{27}{3^{2x}}-12.3^{-x}+1=0$ $27.3^{-2x}-12.3^{-x}+1=0 \quad \text{OR} \quad 27k^2-12k+1=0$ $(9.3^{-x}-1)(3.3^{-x}-1)=0 \quad \text{OR} \quad (9k-1)(3k-1)=0$ $9.3^{-x}-1=0 \text{ or } 3.3^{-x}-1=0$ $3^{-x}=\frac{1}{9} \text{ or } 3^{-x}=\frac{1}{3}$ $3^{-x}=3^{-2} \text{ or } 3^{-x}=3^{-1}$ $x=2 \text{ or } x=1$	✓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)

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

	$\text{LHS} = \frac{1}{\tan x}(\cos x + \tan x.\sin x)$ $= \frac{\cos x}{\tan x} + \frac{\sin x}{1}$ $= \frac{\cos x}{1} \div \frac{\sin x}{\cos x} + \frac{\sin x}{1}$ $= \frac{\cos x}{1} \times \frac{\cos x}{\sin x} + \frac{\sin x}{1}$ $= \frac{\cos^2 x + \sin^2 x}{\sin x}$ $= \frac{1}{\sin x}$ $= \text{RHS}$	✓ 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**

	$\cos\beta = k$ 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]

TOTAL MARKS: 75