KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS

TRIGONOMETRY TEST

MARCH 2026

MARKS: 25

TIME: 30 minutes

This question paper consists of 2 pages.

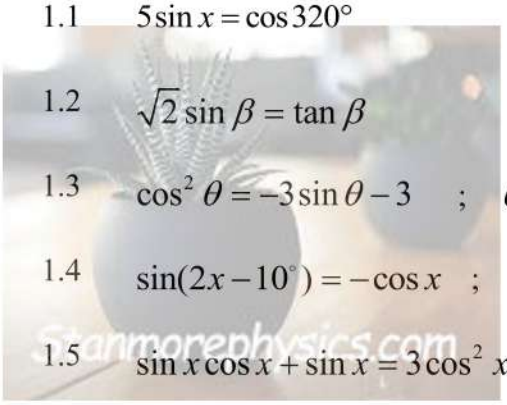
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Number the answers correctly according to the numbering system used in this question paper.
3. Clearly show ALL calculations which you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Write neatly and legibly.

Question 1

1. Solve the following trigonometric equations over the specified interval or leave your answer as general solution if no interval is given:



1.1 $5\sin x = \cos 320°$ (4)

1.2 $\sqrt{2}\sin\beta = \tan\beta$ (4)

1.3 $\cos^2\theta = -3\sin\theta - 3 \quad ; \quad \theta \in [0° ; 360°]$ (5)

1.4 $\sin(2x - 10°) = -\cos x \quad ; \quad x \in [-180° ; 180°]$ (4)

1.5 $\sin x\cos x + \sin x = 3\cos^2 x + \cos x$ (6)

Question 2

2. Given the identity $\dfrac{2\tan\theta - \sin 2\theta}{2\sin^2\theta} = \tan\theta$, determine the values of θ, $\theta \in [180° ; 360°]$ which will make the identity undefined. (2)

[25]

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TRIGONOMETRY (General Solution)

MARKING GUIDELINE

11 MARCH 2026

Duration: 30min

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Question 1			
1.1	$5\cos x = 0,766044$ $\sin x = 0,15320....$ $x = 8,81^\circ$ ref $\angle$ $x = 8.81^\circ + k.360,\ k \in Z$	or $x = 180 - 8.81^\circ + k.360,\ k \in Z$ $x = 171,19^\circ + k.360,\ k \in Z$	✓ $5\cos x = 0,766044$ ✓ $\sin x = 0,15320....$ ✓ $x = 8.81^\circ + k.360,\ k \in Z$ ✓ $x = 171,19^\circ + k.360,\ k \in Z$
1.1.2	$\sqrt{2}\sin\beta = \dfrac{\sin\beta}{\cos\beta}$ $\sqrt{2}\sin\beta\cos\beta = \cos\beta$ $\sqrt{2}\sin\beta\cos\beta - \cos\beta = 0$ $\cos\beta(\sqrt{2}\sin\beta - 1) = 0$ $\cos\beta = 0$ $\beta = 90^\circ + k.360,\ k \in Z$ *or* $\beta = 270^\circ + k.360,\ k \in Z$	or $\sin\beta = \dfrac{1}{\sqrt{2}}$ $\beta = 45^\circ + k.360,\ k \in Z$ $\beta = 135^\circ + k.360,\ k \in$	✓ $\dfrac{\sin\beta}{\cos\beta}$ ✓Factors ✓ $\beta = 90^\circ + k.360,\ k \in Z$ $\beta = 270^\circ + k.360,\ k \in Z$ ✓ $\beta = 45^\circ + k.360,\ k \in Z$ $\beta = 135^\circ + k.360,\ k \in Z$
1.1.3	$\cos^2\theta + 3\sin\theta + 3 = 0$ $1 - \sin^2\theta + 3\sin\theta + 3 = 0$ $-\sin^2\theta + 3\sin\theta + 4 = 0$ $\sin^2\theta - 3\sin\theta - 4 = 0$ $(\sin\theta - 4)(\sin\theta + 1) = 0$ $\sin\theta + 1 = 0$ $\sin\theta = 1$ $\theta = 90 + k.360^\circ\ k \in Z$ $\theta = 90^\circ$ and 270°	or $\sin\theta - 4 = 0$ $\sin\theta \neq 4$	✓ $1 - \sin^2\theta$ ✓Standard form ✓Factors ✓ $\theta = 90 + k.360^\circ\ k \in Z$ ✓ $\theta = 90^\circ$ and 270°

1.1.4	$\sin(2x-10^\circ) = -\sin(90^\circ - x)$ $2x-10^\circ = 90^\circ - x$ ref $\angle$ *case* 1 $2x-10^\circ = 180^\circ + (90^\circ - x) + k.360, \quad k \in Z$ $3x = 280^\circ + k.360$ $x = 93,33^\circ + k.120$ *case* 2 $2x-10^\circ = 360^\circ - (90^\circ - x) + k.360, \quad k \in Z$ $x = 280^\circ + k.360$ $x = -26.67^\circ, -146,67^\circ, 93.33^\circ, 160$	✓ $\sin(2x-10^\circ) = -\sin(90^\circ - x)$ ✓ $x = 93,33^\circ + k.120$ ✓ $x = 280^\circ + k.360$ ✓ $x = -26.67^\circ, -146,67^\circ, 93.33^\circ, 160$
1.1.5	$\sin x(\cos x + 1) = 3\cos x(\cos x + 1)$ $\sin x(\cos x + 1) - 3\cos x(\cos x + 1) = 0$ $(\cos x + 1)(\sin x - 3\cos x) = 0$ $\cos x + 1 = 0$ or $\sin x - 3\cos x = 0$ $\cos x = -1$ $\sin x = 3\cos x$ $x = 180^\circ + k.360, \ k \in Z$ $\tan x = 3$ $x = 71.57 + k.180^\circ$	✓ $\sin x(\cos x + 1) = 3\cos x(\cos x + 1)$ ✓ $(\cos x + 1)(\sin x - 3\cos x) = 0$ ✓ $\cos x = -1$ ✓ $\tan x = 3$ ✓ $x = 180^\circ + k.360, \ k \in Z$ ✓ $x = 71.57 + k.180^\circ$
Question 2		
2.1	$2\sin^2\theta = 0$ $\sin\theta = 0$ $\theta = 180^\circ$ and 360° $\theta = 270^\circ$	✓ $\theta = 180^\circ$ and 360° ✓ $\theta = 270^\circ$