



DEPARTMENT OF EDUCATION
DEPARTEMENT VAN ONDERWYS
LEFAPHA LA THUTO
ISEBE LEZEMFUNDO

PROVINCIAL TEST

GRADE 11

MATHEMATICS

MARCH 2026

PUNTE/MARKS: 75

TYD/TIME: 1½ uur/hours

**Hierdie vraestel bestaan uit 5 bladsye./
This question paper consists of 5 pages.**

INSTRUCTIONS:

1. This test consists of 3 QUESTIONS. Answer ALL the questions.
2. Number the answers correctly according to the numbering system used in this test.
3. Clearly show ALL calculations, diagrams, graphs, etcetera that you used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved calculator.
6. Write neatly and legibly.



QUESTION 1

1.1 Solve for x :

1.1.1 $3x^2 - 5x = 4$ (correct to TWO decimal places) (3)

1.1.2 $x + \sqrt{x-2} = 2$ (4)

1.1.3 $x(x-4) > 3(x-4)$ (4)

1.1.4 $3^{x+1} + 3^{x-1} = \frac{10}{9}$ (3)

1.1.5 $(x-3)^{\frac{2}{3}} = 9$ (4)

1.2 If $\frac{x}{y} + \frac{y}{x} = \frac{17}{4}$, calculate the value(s) of $\frac{x}{y}$ (4)

1.3 Solve for x and y :

$2x - y = 1$ and $y^2 - xy = x + 7$ (6)

[28]

QUESTION 2

2.1 If $P = \frac{\sqrt{x+3}}{x-5}$, determine the value(s) of x for which:

2.1.1 P is undefined. (1)

2.1.2 P not real. (2)

2.2 Simplify the following WITHOUT the use of a calculator:

2.2.1 $\left[\frac{512x^3}{64x^{-3}} \right]^{\frac{-1}{3}}$ (3)

2.2.2 $\frac{6^{n+2} \times 10^{n-2}}{4^n \cdot 15^{n-2}}$ (4)

2.3 If $\frac{14}{\sqrt{63} - \sqrt{28}} = x\sqrt{y}$, where $x, y \in R$ proof WITHOUT the use of a calculator that $x = 2$ and $y = 7$. Show ALL your calculations. (3)

2.4 Given $ax^2 + bx + c = 0$ with $a > 0; b < 0$ and $c < 0$.

2.4.1 Determine the nature of the roots. (2)

2.4.2 Make a rough draft of your answer in 2.4.1 (2)

2.5 Determine the value of p , if $x^2 + 2px + 5p + 6 = 0$ have no real roots. (3)

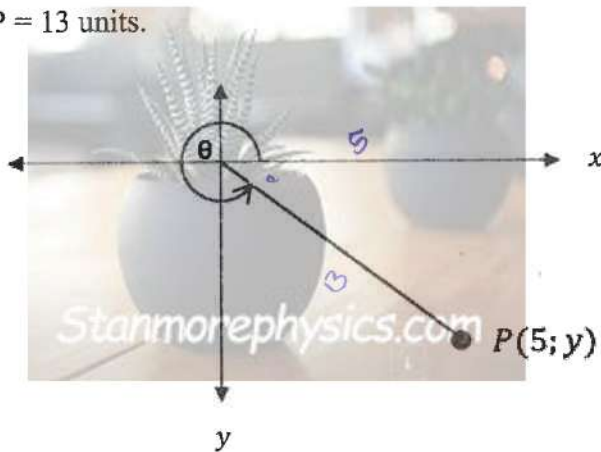
[20]

QUESTION 3

3.1 Determine in which quadrant the following will be, if:
 $\cos \theta > 0$ and $\tan \theta < 0$. (1)



3.2 In the diagram below P (5; y) is a point in the Cartesian plane, such that
 OP = 13 units.



3.2.1 Determine the y -coordinate of P. (3)

3.2.2 Hence, determine the value of the following, WITHOUT the use of a calculator:

(a) $\sin \theta$ (2)

(b) $\tan^2 \theta - 3$ (2)

3.3 Solve the next equation, correct to ONE decimal place.

3.3.1 $\sin \alpha = \tan 32^\circ$ (2)

3.3.2 $\cos(2\beta + 10^\circ) = 0,866$ (3)

3.4 Determine the value of the following expression, WITHOUT the use of a calculator, show ALL your calculations. $\sqrt{1 - \cos^2 30^\circ}$ (3)

3.5 Simplify the following:

3.5.1 $\sqrt{2} \cdot \tan 150^\circ \cdot \cos 225^\circ \cdot \sin 300^\circ$ (5)

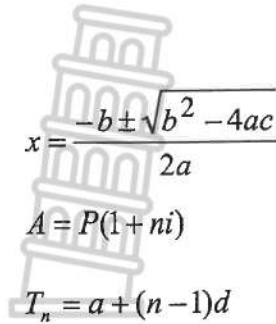
3.5.2
$$\frac{\tan(\theta - 180^\circ) \cdot \cos^2(180^\circ + \theta)}{\cos(90^\circ + \theta)}$$
 (6)

[27]

TOTAL: 75



INFORMATION SHEET



$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

$$T_n = ar^{n-1}$$

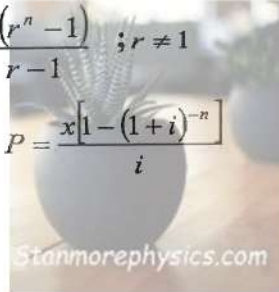
$$S_n = \frac{a(r^n - 1)}{r - 1}; r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

$$F = \frac{x[(1 + i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1 + i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

In ΔABC : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{area } \Delta ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$\bar{x} = \frac{\sum fx}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ of } B) = P(A) + P(B) - P(A \text{ en } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



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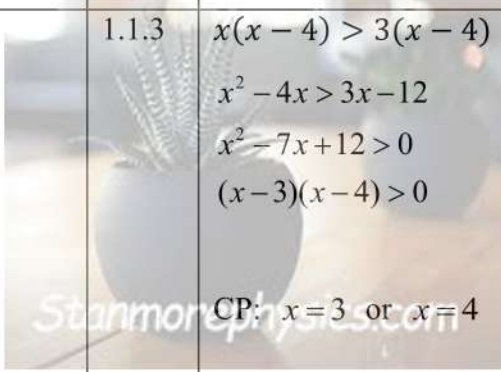
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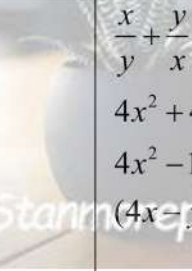
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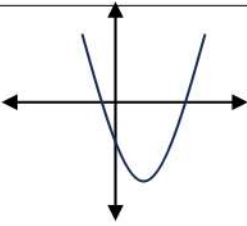
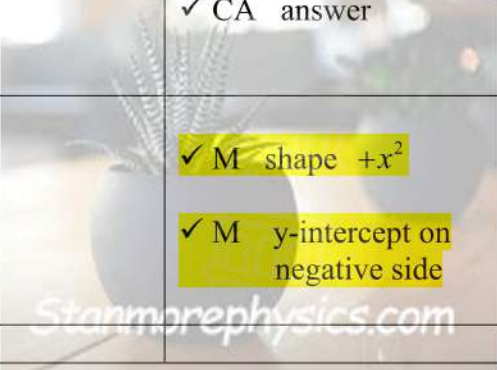
**Hierdie nasienriglyne bestaan uit 7 bladsye./
These marking guidelines consist of 7 pages.**

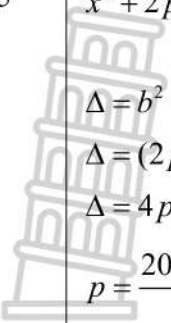

QUESTION 1				
1.1	1.1.1	$3x^2 - 5x = 4$ $3x^2 - 5x - 4 = 0$ $x = \frac{5 \pm \sqrt{(-5)^2 - 4(3)(-4)}}{2(3)}$ $x = 2,26 \text{ or } -0,59$	<ul style="list-style-type: none"> ✓ M standard form ✓ CA substitution ✓ CA both answers 	(3)
	1.1.2	$x + \sqrt{x-2} = 2$ $\sqrt{x-2} = 2-x$ $x-2 = (2-x)^2$ $x-2 = 4-4x+x^2$ $0 = x^2 - 5x + 6$ $0 = (x-3)(x-2)$ $\therefore x = 3 \text{ or } x = 2$ <p style="text-align: center;">n.a.</p>	 <ul style="list-style-type: none"> ✓ M square both sides correctly ✓ M standard form ✓ A factorise ✓ CA answer <p>learner must indicate which answers apply and which one is n.a. to get the last mark</p>	(4)
	1.1.3	$x(x-4) > 3(x-4)$ $x^2 - 4x > 3x - 12$ $x^2 - 7x + 12 > 0$ $(x-3)(x-4) > 0$ <p style="text-align: center;">CP: $x = 3$ or $x = 4$</p> $\therefore x < 3 \text{ OR } x > 4$	 <ul style="list-style-type: none"> ✓ S simplify ✓ M standard form ✓ A factorise / CV ✓ CA answer <p>learner must answer in correct inequality form, otherwise B/D</p>	(4)
	1.1.4	$3^{x+1} + 3^{x-1} = \frac{10}{9}$ $3^x \left(3 - \frac{1}{3}\right) = \frac{10}{9}$ $3^x \left(\frac{10}{3}\right) = \frac{10}{9}$ $3^x = \frac{1}{3}$ $3^x = 3^{-1}$ $\therefore x = -1$	<ul style="list-style-type: none"> ✓ M common factor ✓ S simplify ✓ CA answer 	(3)

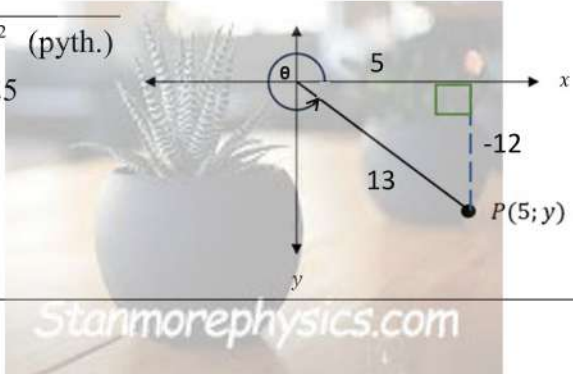
	<p>1.1.5</p> $(x - 3)^{\frac{2}{3}} = 9$ $(x - 3)^{\frac{2}{3}} = 3^2$ $(x - 3)^{\frac{2}{3} \times \frac{3}{2}} = 3^{2 \times \frac{3}{2}}$ $x - 3 = \pm 3^3$ $\therefore x - 3 = 27 \quad \text{or} \quad \therefore x - 3 = -27$ $x = 30 \quad \text{or} \quad x = -24$	<p>✓M prime factor</p> <p>✓M X to the power of $\frac{3}{2}$</p> <p>✓S simplify</p> <p>✓CA both answers</p>	<p>(4)</p>
<p>1.2</p> $\frac{x}{y} + \frac{y}{x} = \frac{17}{4}$ $\frac{x}{y} + \left(\frac{x}{y}\right)^{-1} = \frac{17}{4}$ <p>make $\frac{x}{y} = k$</p> $k + k^{-1} = \frac{17}{4}$ $k + \frac{1}{k} = \frac{17}{4}$ $4k^2 + 4 = 17k$ $4k^2 - 17k + 4 = 0$ $(4k - 1)(k - 4) = 0$ $\therefore k = \frac{1}{4} \quad \text{or} \quad \therefore k = 4$ $\therefore \frac{x}{y} = \frac{1}{4} \quad \text{or} \quad \therefore \frac{x}{y} = 4$		<p>✓M rewrite $\left(\frac{x}{y}\right)^{-1}$</p> <p>✓M LCM: 4k</p> <p>✓S factorise</p> <p>✓CA both answer</p>	<p>(4)</p>
<p>OR alternative method for 1.2</p>			
	$\frac{x}{y} + \frac{y}{x} = \frac{17}{4}$ $4x^2 + 4y^2 = 17xy$ $4x^2 - 17xy + 4y^2 = 0$ $(4x - y)(x - 4y) = 0$ $\therefore 4x - y = 0 \quad \text{or} \quad \therefore x - 4y = 0$ $\therefore 4x = y \quad \text{or} \quad \therefore x = 4y$ $\therefore \frac{x}{y} = \frac{1}{4} \quad \text{or} \quad \therefore \frac{x}{y} = 4$	<p>✓M LCM: 4k</p> <p>✓M standard form</p> <p>✓S factorise</p> <p>✓CA both answer</p>	<p>(4)</p>


1.3	$2x - y = 1$ $2x - 1 = y$ $y^2 - xy = x + 7$ $(2x - 1)^2 - x(2x - 1) = x + 7$ $4x^2 - 4x + 1 - 2x^2 + x - x - 7 = 0$ $2x^2 - 4x - 6 = 0$ $x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $\therefore x = 3 \quad \text{OR} \quad \therefore x = -1$ $\therefore y = 5 \quad \quad \quad \therefore y = -3$ 	✓ M rewrite to make y the subject in equation 1 ✓ M subst. ✓ S simplify ✓ CA factorise ✓ CA both x-values ✓ CA both y-values	(6)
			[28]

QUESTION 2			
2.1.1	Undefined $x - 5 = 0$ $\therefore x = 5$	✓ A	(1)
2.1.2	Not real $x + 3 < 0$ $\therefore x < -3$	✓ M ✓ A	(2)
2.2.1	$\left[\frac{512x^3}{64x^{-3}} \right]^{-\frac{1}{3}}$ $= \left[\frac{64x^{-3}}{512x^3} \right]^{\frac{1}{3}}$ $= \left[\frac{2^6}{2^9 x^6} \right]^{\frac{1}{3}}$ $= \left[\frac{1}{2^3 x^6} \right]^{\frac{1}{3}}$ $= \frac{1}{2x^2}$ 	✓ M prime and expo law ✓ S simplify ✓ CA answer	(3)

<p>2.2.2</p>	$\frac{6^{n+2} \times 10^{n-2}}{4^n \cdot 15^{n-2}}$ $\frac{3^{n+2} \cdot 2^{n+2} \times 5^{n-2} \cdot 2^{n-2}}{2^{2n} \cdot 3^{n-2} \cdot 5^{n-2}}$ $= 2^{n+2+n-2-2n} \cdot 3^{n+2-n+2} \cdot 5^{n-2-n+2}$ $= 2^0 \cdot 3^4 \cdot 5^0$ $= 81$	<ul style="list-style-type: none"> ✓ M prime ✓ M expo law ✓ S simplify ✓ CA answer 	<p>(4)</p>
<p>2.3</p>	$\frac{14}{\sqrt{63} - \sqrt{28}}$ $= \frac{14}{\sqrt{3^2 \times 7} - \sqrt{2^2 \times 7}}$ $= \frac{14}{3\sqrt{7} - 2\sqrt{7}}$ $= \frac{14}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$ $= \frac{14\sqrt{7}}{7}$ $= 2\sqrt{7}$ <p>meaning that $x = 2$ and $y = 7$ is proved</p>	 <ul style="list-style-type: none"> ✓ S simplify ✓ M multiply with $\frac{\sqrt{7}}{\sqrt{7}}$ ✓ S simplify 	<p>(3)</p>
<p>2.4.1</p>	$\Delta = b^2 - 4ac$ $\therefore \Delta = (-)^2 - 4(+)(-)$ $\therefore \Delta = +$ <p>Nature of the root $\Delta > 0$, real</p>	<ul style="list-style-type: none"> ✓ M $\Delta > 0$ ✓ CA answer 	<p>(2)</p>
<p>2.4.2</p>		 <ul style="list-style-type: none"> ✓ M shape $+x^2$ ✓ M y-intercept on negative side 	<p>(2)</p>

<p>2.5</p>  $x^2 + 2px + (5p + 6) = 0$ $\Delta = b^2 - 4ac$ $\Delta = (2p)^2 - 4(1)(5p + 6)$ $\Delta = 4p^2 - 20p - 24$ $p = \frac{20 \pm \sqrt{(-20)^2 - 4(4)(-24)}}{2(4)}$ $p = 6 \text{ or } -1$ $\Delta < 0$ $\therefore -1 < p < 6$		<p>✓ M subst. in Δ</p> <p>✓ critical points</p> <p>✓ CA answer</p> <p>learner must answer in inequality form, otherwise B/D</p>	<p>(3)</p> <p>[20]</p>
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QUESTION 3:			
3.1	Quadrant 4	✓ A	(1)
3.2.1	$y^2 = 13^2 - 5^2$ (pyth.) $y^2 = 169 - 25$ $y^2 = 144$ $y = \pm 12$ $\therefore y = -12$ 	<p>✓ M</p> <p>✓ R pythagoras</p> <p>✓ A choosing the correct value of $y = -12$</p>	(3)
3.2.2a	$\sin \theta$ $= \frac{-12}{13}$	✓ ✓ CA from 3.2.1	(2)
3.2.2b	$\tan^2 \theta - 3$ $= \left[\frac{-12}{5} \right]^2 - 3$ $= \frac{144}{25} - \frac{75}{25}$ $= \frac{69}{25}$	<p>✓ M subst. value $\tan \theta$</p> <p>✓ CA</p>	(2)

3.3.1	$\sin \alpha = \tan 32^\circ$ $\sin \alpha = 0,62486\dots$ $\therefore \alpha = 38,7^\circ$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> Penalize only ONCE for incorrect rounding </div>	✓ M $\tan 32 = 0,62486\dots$ ✓ answer	(2)
3.3.2	$\cos(2\beta + 10^\circ) = 0,866$ $\therefore 2\beta + 10^\circ = 30,0029\dots$ $\therefore 2\beta = 20,0029\dots$ $\therefore \beta = 10^\circ$		✓ M shift ✓ S ✓ answer	(3)
3.4	$\sqrt{1 - \cos^2 30^\circ}$ $= \sqrt{1 - \left[\frac{\sqrt{3}}{2}\right]^2}$ $= \sqrt{1 - \frac{3}{4}}$ $= \sqrt{\frac{1}{4}}$ $= \frac{1}{2}$		✓ subst. special Δ ✓ S ✓ answer	(3)
3.5.1	$\sqrt{2} \cdot \tan 150^\circ \cdot \cos 225^\circ \cdot \sin 300^\circ$ $= \sqrt{2} \cdot (-\tan 30^\circ) \cdot (-\cos 45^\circ) \cdot (-\sin 60^\circ)$ $= \sqrt{2} \cdot \left[\frac{-1}{\sqrt{3}}\right] \left[\frac{-1}{\sqrt{2}}\right] \left[\frac{-\sqrt{3}}{2}\right]$ $= \frac{-1}{2}$		✓ M reduction ✓ M reduction ✓ M reduction ✓ subst. special Δ ✓ CA	(5)
3.5.2	$\frac{\tan(\theta - 180^\circ) \cdot \cos^2(180 + \theta)}{\cos(90^\circ + \theta)}$ $= \frac{\tan \theta \cdot (-\cos \theta)^2}{-\sin \theta}$ $= \frac{\sin \theta}{\cos \theta} \cdot \cos^2 \theta$ $= \frac{\sin \theta}{-\sin \theta}$ $= -\cos \theta$		✓ M reduction ✓ M reduction ✓ M reduction ✓ $(-\cos \theta)^2 = \cos^2 \theta$ Directly to $\cos^2 \theta$ loose one mark (-1) must show reduction first ✓ M identity ✓ CA	(6)
				[27]

TOTAL :75