LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

SEKHUKHUNE EAST DISTRICT – DISTRICT ON THE RISE

GRADE 10

MATHEMATICS

TEST 1

11 MARCH 2024

TOTAL MARKS: 50

DURATION: 1 HOUR

This question paper consists of 4 pages including the cover page.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of THREE questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.
5. Answers only will not necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Write neatly and legibly.

QUESTION 1

1.1 Show that the decimal $0,\dot{2}\dot{8}$ is a rational number. (3)

1.2 Determine, without the use of a calculator, between which two integers the number $\sqrt{42}$ will lie. (2)

1.3 Factorise the following expressions:

1.3.1 $a^3 - a^2$ (1)

1.3.2 $y^2 - yx - z^2 - zx$ (3)

1.4 Expand and simplify:

1.4.1 $\dfrac{y^2 - y - 6}{y^2 - 3y} \div (y + 2)$ (3)

1.4.2 $\dfrac{3^{2x+2} - 9^x}{3^x . 3^{2x+1}}$ (3)

1.5 Determine the value of p, if $(x - 3)$ is a factor is of $3x^2 - px - 6$ (3)

[18]

QUESTION 2

2.1 Determine the value of x if $x^{\frac{1}{2}} = 5$ (2)

2.2 Solve for x:

2.2.1 $2x - 9 = 3$ (1)

2.2.2 $x(x - 6) = 27$ (3)

2.2.3 $2^x = \dfrac{1}{8}$ (2)

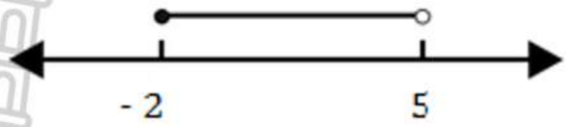
2.2.4 $v^2 = u^2 + 2ax$ (2)

2.3 Solve x and y simultaneously:

$2x + 3y = 4$ and $-6y - 2x = 2$ (4)

2.4 Given: $a + b = 2$ and $a^2 - b^2 = 8$. Determine the value of $b - a$ (3)

2.5 Give an inequality in terms of x, which gives the set of numbers represented on the number line below, for $x \in \mathbf{N}_0$



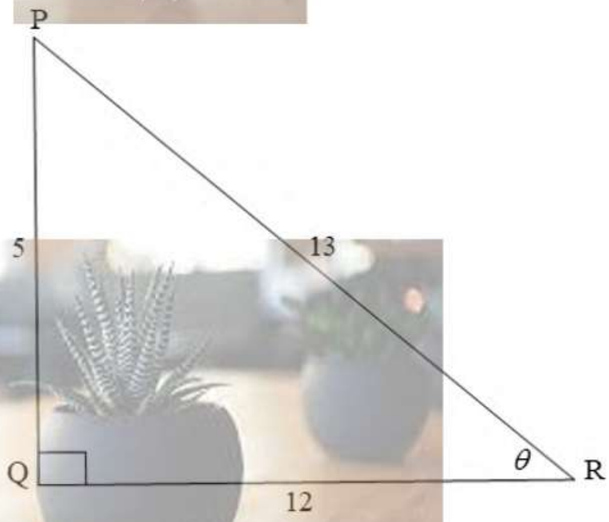
(2)

2.6 Paul is twice Lola's age. Twelve years ago, Paul was three times Lola's age. Determine how old Lola is now. (3)

[22]

QUESTION 3

3.1 In Δ PQR, $\hat{Q} = 90°$ and $\hat{R} = \theta$. PQ = 5 units, QR = 12 units and PR = 13 units.



Write down the values of:

3.1.1 $\sin\theta$ (2)

3.1.2 $\sec\theta$ (2)

3.1.3 $\tan\theta$ (2)

3.2 Without using a calculator, determine the value of:

$\sin^2 45° - \cos 60° + \tan 10° . \cot 10°$ (4)

[10]

TOTAL: 50 MARKS

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GRADE 10

MATHEMATICS

TEST 1

MARKING GUIDELINES

11 MARCH 2024

TOTAL MARKS: 50

This marking guidelines consists of 5 pages including the cover page.

NOTE:

- **If a candidate answers a question TWICE, mark only the first one.**
- **Consistent accuracy applies in ALL aspects of the marking memorandum.**

QUESTION 1

1.1	Let $x = 0{,}282828$ ..... (i) $100\,x = 28{,}2828$ ..... (ii) $99x = 28$ $\therefore x = \frac{28}{99}$	✓ Equation (i) and (ii) ✓ $99x = 28$ ✓ $x = \frac{28}{99}$	(3)
1.2	$\sqrt{36} < \sqrt{42} < \sqrt{49}$ $6 < \sqrt{42} < 7$ $\sqrt{42}$ lies between 6 and 7	✓ $\sqrt{36} < \sqrt{42} < \sqrt{49}$ ✓ $6 < \sqrt{42} < 7$	(2)
1.3.1	$a^3 - a^2 = a^2(a-1)$	✓ $a(a-1)$	(1)
1.3.2	$y^2 - yx - z^2 - zx$ $y^2 - z^2 - yx - zx$ $(y+z)(y-z) - x(y+z)$ $(y+z)(y-z-x)$	✓ Common factor ✓ Difference of 2 squares ✓ Answer	(3)
1.4.1	$\frac{y^2 - y - 6}{y^2 - 3y} \div (y+2)$ $\frac{(y-3)(y+2)}{y(y-3)} \times \frac{1}{y+2}$ $= \frac{1}{y}$	✓ Factors (numerator & denominator) ✓ $\frac{1}{y+2}$ and × sign ✓ Answer	(3)
1.4.2	$\frac{3^{2x+2} - 9^x}{3^x . 3^{2x+1}}$ $= \frac{3^{2x} . 3^2 - 3^{2x}}{3^x . 3^{2x} . 3^1}$ $= \frac{3^{2x}(3^2 - 1)}{3^x . 3^{2x} . 3}$ $= \frac{8}{3^{x+1}}$	✓ Simplification ✓ Common factor ✓ Answer	(3)

1.5	$3x^2 - px - 6$ $= (x - 3)(3x + 2)$ $= 3x^2 - 7x - 6$ $\therefore p = 7$	✓ $(3x + 2)$ ✓ Product ✓ Answer	(3)
			[18]

QUESTION 2

2.1	$x^{\frac{1}{2}} = 5$ $\left(x^{\frac{1}{2}}\right)^2 = 5^2$ $x = 25$	✓ Raise to reciprocal exponent ✓ Answer	(2)
2.2.1	$2x - 9 = 3$ $2x = 12$ $x = 6$	✓ Answer	(1)
2.2.2	$x(x - 6) = 27$ $x^2 - 6x - 27 = 0$ $(x - 9)(x + 3) = 0$ $x = 9$ or $x = -3$	✓ Standard form ✓ Factors ✓ Both answers	(3)
2.2.3	$2^x = \frac{1}{8}$ $2^{-x} = 2^{-3}$ $-x = -3$ $x = 3$	✓ equating exponents ✓ answer	(2)
2.2.4	$v^2 = u^2 + 2ax$ $v^2 - u^2 = 2ax$ $x = \frac{v^2 - u^2}{2a}$	✓ $v^2 - u^2 = 2ax$ ✓ Answer	(2)

2.3	$2x + 3y = 4$ ... ① $-6y - 2x = 2$ ... ② $-3y - x = 1$ $-3y - 1 = x$ ... ③ Substitute ③ into equation ① $2(-3y - 1) + 3y = 4$ $-6y - 2 + 3y = 4$ $-3y = 6$ $y = -2$ $-3(-2) - 1 = x$ $\therefore x = 5$	✓ Equation…③ ✓ Substitution ✓ y - value ✓ x - value	(4)
2.4	$a + b = 2$ and $a^2 - b^2 = 8$ $a^2 - b^2 = 8$ $(a + b)(a - b) = 8$ but $(a + b) = 2$ $2(a - b) = 8$ $a - b = 4$ $-b + a = 4$ $-(b - a) = 4$ $b - a = -4$	✓$2(a - b) = 8$ ✓$a - b = 4$ ✓ $b - a = -4$	(3)
2.5	$0 \leq x < 5$, $x \in \mathbb{N}_0$	✓ End points ✓ Notation	(2)
2.6	$3(x - 12) = 2x - 12$ $3x - 36 = 2x - 12$ $x = 24$	✓ Both equations ✓ Simplification ✓ Answer	(3)
			[22]

QUESTION 3

3.1.1	$sin\,\theta = \frac{5}{13}$	$\frac{\checkmark 5}{\checkmark 13}$	(2)
3.1.2	$\sec\theta = \frac{13}{12}$	$\frac{\checkmark 13}{\checkmark 12}$	(2)
3.1.3	$\tan\theta = \frac{5}{12}$	$\frac{\checkmark 5}{\checkmark 12}$	(2)
3.1	$\sin^2 45° - \cos 60° + \tan 10° \cdot \cot 10°$ $= \left(\frac{1}{\sqrt{2}}\right)^2 - \frac{1}{2} + 1$ $= \frac{1}{2} - \frac{1}{2} + 1$ $= 1$	$\checkmark \frac{1}{\sqrt{2}} \checkmark \frac{1}{2} \checkmark 1$ ✓ Answer	(4)
			[10]

TOTAL: 50 MARKS