LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

SEKHUKHUNE EAST DISTRICT – DISTRICT ON THE RISE

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GRADE 11

MATHEMATICS

TEST 1

MARKING GUIDELINES

11 MARCH 2024

TOTAL MARKS: 50

This marking guidelines consists of 7 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	$\left(\frac{8a^4}{a}\right)^{\frac{2}{3}}$ $= (2^3a^3)^{\frac{2}{3}}$ $= 2^2a^2$ $= 4a^2$	✓ 2^3 ✓ a^3 ✓ 4 ✓a^2	(4)
1.2	$(27)^{\frac{2}{3}} + \left(\frac{1}{2}\right)^{-2} - 5^0$ $= (3^3)^{\frac{2}{3}} + (2^{-1})^{-2} - 1$ $= 3^2 + 2^2 - 1$ $= 12$	✓ 3^3 ✓ -1 ✓ 3^2 ✓ 2^2 ✓ Answer	(5)
1.3	$\sqrt{32} - \sqrt{18} + 2\sqrt{50}$ $= 4\sqrt{2} - 3\sqrt{2} + 10\sqrt{2}$ $= 11\sqrt{2}$	✓ $4\sqrt{2}$ ✓ $3\sqrt{2}$ ✓ $10\sqrt{2}$ ✓ Answer	(4)
1.4	$\frac{2^{p+4} - 6.2^{p+1}}{5.2^{p+2}}$ $= \frac{2^{p+1}(2^3 - 6)}{5.2^{p+2}}$ $= \frac{2^{p+1}(2^3 - 6)}{5.2^1.2^{p+1}}$ $= \frac{(2^3 - 6)}{5.2^1}$ $= \frac{2}{10}$ $= \frac{1}{5}$	✓ Common factor ✓ Denominator ✓ Simplifying ✓ Answer	(4)

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1.5	$\frac{9^x + 3^{2x+1}}{18^x . 2^{-x}}$ $= \frac{3^{2x} + 3^{2x+1}}{2^x . 3^{2x} . 2^{-x}}$ $= \frac{3^{2x}(1 + 3^1)}{2^0 . 3^{2x}}$ $= 4$	✓ Prime bases ✓Common factor ✓2^0 ✓ Answer	(4)
1.6	$\frac{x-3}{x+3} - \frac{x+3}{x^2-9}$ $= \frac{x-3}{x+3} - \frac{x+3}{(x-3)(x+3)}$ $= \frac{(x-3)(x-3) - (x+3)}{(x-3)(x+3)}$ $= \frac{x^2 - 6x + 9 - x - 3}{(x-3)(x+3)}$ $= \frac{x^2 - 7x + 6}{(x-3)(x+3)}$	✓ $(x-3)(x+3)$ ✓ LCD ✓$x^2 - 6x + 9$ ✓$-x - 3$ ✓ Answer	(5)
			[26]

QUESTION 2

2.1.1	$(3x - 5)(x + 1) = 0$ $\therefore x = \frac{5}{3}$ or $x = -1$	✓ $x = \frac{5}{3}$ ✓ $x = -1$	(2)
2.1.2	$3x^2 + 5x + 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-5 \pm \sqrt{5^2 - 4(3)(1)}}{2(3)}$ $x = \frac{-5 \pm \sqrt{13}}{6}$ $\therefore x = -0{,}23$ or $x = -1{,}43$	✓Substitution ✓✓ Answers	(3)

2.1.3	$3\sqrt{x+2}-1=2x-6$ $3\sqrt{x+2}=2x-5$ $\left(3\sqrt{x+2}\right)^2=(2x-5)^2$ $9(x+2)=4x^2-20x+25$ $0=4x^2-29x+7$ $0=(4x-1)(x-7)$ $x\neq\frac{1}{4}$ or $x=7$	✓ Isolating surd ✓ Squaring both sides ✓ Standard form ✓ Factors ✓ $x\neq\frac{1}{4}$ ✓ $x=7$	(6)
2.1.4	$\frac{x}{x-1}-\frac{2x+4}{3x+1}=-4$ $x(3x+1)-(2x+4)(x-1)=-4(x-1)(3x+1)$ $x^2-x+4=-12x^2+8x+4$ $13x^2-9x=0$ $x(13x-9)=0$ $x=0$ or $x=\frac{9}{13}$	✓ × LCD ✓ Simplifying ✓ Standard form ✓ Factors ✓ $x=0$ ✓ $x=\frac{9}{13}$	(6)
2.1.5	$7^{x-1}=49$ $7^{x-1}=7^2$ $x-1=2$ $x=3$	✓ Prime base ✓ Equating exponents ✓ Answer	(3)
2.1.6	$(2x-3)(x+1)<3$ $2x^2-x-3<3$ $2x^2-x-6<0$ $(2x+3)(x-2)<0$ C.V. $x=-\frac{3}{2}$ or $x=2$ + $-\frac{3}{2}$ - 2 + $-\frac{3}{2}<x<2$	✓ Multiplying out () ✓ Standard from ✓ Factors ✓ Critical values ✓✓ Answer	(6)

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2.2	$2x - 2 = y$ ... ① $2x^2 + y^2 = 2$ ... ② Substitute ① into ② $2x^2 + (2x - 2)^2 = 2$ $6x^2 - 8x + 2 = 0$ $(6x - 1)(x - 2) = 0$ $x = \frac{1}{6}$ or $x = 2$ $2\left(\frac{1}{6}\right) - 2 = y$ or $2(2) - 2 = y$ $y = -\frac{5}{3}$ or $y = 2$	✓ Substitution ✓ Standard from ✓ Factors ✓ x – values ✓ Substitution ✓ y – values	(6)
			[32]

QUESTION 3

3.1	$x^2 - 3x - m = 0$ $\Delta = b^2 - 4ac$ $\Delta = (-3)^2 - 4(1)(-m)$ $\Delta = 9 + 4m$ $0 = 9 + 4m$ $m = -\frac{9}{4}$	✓ Substitution ✓ Δ ✓ $\Delta = 0$ ✓ Answer	(4)
3.2	$mx^2 + mx - 12 = 0$ $\Delta = (m)^2 - 4(m)(-12)$ $\Delta = m^2 + 48m$ $m^2 > 0$ if $m > 0$ and $48m > 0$ if $m > 0$ $\therefore \Delta > 0$	✓ Substitution ✓ Δ ✓ $m^2 > 0$ ✓ $48m > 0$	(4)
			[8]

QUESTION 4

4.1.1	$\cos 195°$ $= \cos(180° + 15°)$ $= -\cos 15$ $= -p$	✓ Reduction formula ✓ Simplifying ✓ Answer	(3)
4.1.2	$\sin 105°$ $= \sin(90° + 15°)$ $= \cos 15°$ $= p$	✓ Co-ratio ✓ Simplifying ✓ Answer	(3)
4.1.3	$y = \sqrt{1 - p^2}$ Pythagoras theorem $\sin 15°$ $= \frac{\sqrt{1 - p^2}}{1}$	✓ $y = \sqrt{1 - p^2}$ ✓ Answer	(2)
4.2	$\frac{\sin(180° - A).\tan A.\sin(90° + A)}{\tan(180° + A).\sin(-A).\cos(-A)}$ $= \frac{\sin(A).\tan A.\cos(A)}{\tan(A).(-\sin(A)).\cos(A)}$ $= -1$	$\frac{\checkmark \sin(A).\tan A.\checkmark\cos(A)}{\checkmark\tan(A).\checkmark(-\sin(A)).\checkmark\cos(A)}$ ✓ Answer	(6)
4.3	$\frac{\cos(x - 360°).\tan(180 - x).\cos(90° - x)}{\sin(180° + x).(1 - cos^2(-x))}$ $= \frac{\cos(-(360° - x)).\tan(180 - x).\cos(90° - x)}{\sin(180° + x).(1 - cos^2(x))}$ $= \frac{\cos(x).(-\tan(x)).\sin x}{-\sin(x).(sin^2(x))}$ $= \frac{\frac{\cos x}{1}.\frac{-\sin x}{\cos x}.\frac{\sin x}{1}}{-sin^3 x}$ $= \frac{1}{\sin x}$	$\frac{\checkmark\cos(-(360° - x))}{(1 - \ \checkmark cos^2(x))}$ $\frac{\checkmark\cos(x).\ \checkmark(-\tan(x)).\ \checkmark\sin x}{\checkmark -\sin(x).\ \checkmark(sin^2(x))}$ ✓ $\frac{-\sin x}{\cos x}$ ✓ Answer	(9)
			[23]

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QUESTION 5

5.1	$(\sin x + \cos x)^2 = 1 + 2\sin x . \cos x$ LHS $= (\sin x + \cos x)^2$ LHS $= sin^2x + 2\sin x \cos x + cos^2x$ LHS $= 1 + 2\sin x \cos x$ LHS = RHS	✓ $\sin^2x + \cos^2x$ ✓ $2\sin x \cos x$ ✓ 1	(3)
5.2.1	$\frac{\sin x}{1+\cos x} + \frac{\cos x}{\sin x} = \frac{1}{\sin x}$ LHS $= \frac{\sin x}{1+\cos x} + \frac{\cos x}{\sin x}$ LHS $= \frac{sin^2x + \cos x\,(1+\cos x)}{(1+\cos x).\sin x}$ LHS $= \frac{sin^2x + \cos x + cos^2x}{(1+\cos x).\sin x}$ LHS $= \frac{1+\cos x}{(1+\cos x).\sin x}$ LHS $= \frac{1}{\sin x}$ LHS = RHS	✓ Numerator ✓ LCM ✓ Simplifying ✓1 ✓ Simplifying	(5)
5.2.2	$x = 0°;\ 180°; 360°$	✓ 0° ✓180° ✓ 360°	(3)
			[11]

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