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GRADE 10

MATHEMATICS

GRADE 10

INFORMAL TEST 1

TERM 1

19 FEBRUARY 2024

MARKS: 25

DURATION: 30 MINUTES

This question paper consists of 4 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

- 1. This question paper consists of three question.
- 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, etc. which 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 otherwise stated.
- 7. If necessary, round off answers to TWO decimal places, unless stated otherwise



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QUESTION 1

1.1 Given that:

$$P = \sqrt{\frac{9}{11-x}}$$
, where $x \in \{-11; -5; 0; 15\}$

For which value(s) of x, is P

QUESTION 2

2.1 Factorise the following expressions fully:

$$2.1.1 \quad xy^2 + 3x^2y \tag{1}$$

$$2.1.2 \quad x^2 - 7x - 18 \tag{2}$$

$$2.1.3 \quad x^2y - 16 + 4y - 4x^2 \tag{3}$$

2.2 Simplify the following expressions fully:

2.2.1
$$(2x-1)(x^2-3x+1)$$
 (3)

$$2.2.2 \quad \frac{2^{-2n}.3^{-3n}}{2^{2n}.4^{n-1}.12^{-3n}} \tag{4}$$

QUESTION 3

3. Solve for x:

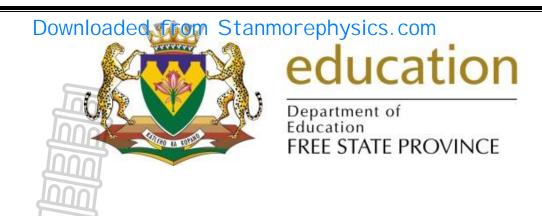
$$3.1 5^{x+2} = 1 (2)$$

$$3.2 3^{3x+2} = 27 (3)$$

$$3.3 2^{x+1} - 2^x = 16 (3)$$

[8]

[13]



NATIONAL SENIOR CERTIFICATE

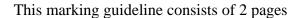
GRADE 10

MATHEMATICS

TERM 1

2024 INFORMAL TEST 1

MARKING GUIDELINE



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1.1	$P = \sqrt{\frac{9}{11 - x}} = \sqrt{\frac{9}{11 - (-5)}} = \sqrt{\frac{9}{16}} = \frac{3}{4} \text{ rational } x = -5$	✓ answer (1)
1.2	$P = \sqrt{\frac{9}{11 - x}} = \sqrt{\frac{9}{11 - (-11)}} = \sqrt{\frac{9}{22}} = 0,6396021491$	$\checkmark x = -11$ $\checkmark x = 0$	2)
	$P = \sqrt{\frac{9}{11 - x}} = \sqrt{\frac{9}{11 - (0)}} = \sqrt{\frac{9}{11}} = 0,9045340337$ $x = -11 \text{ and } x = 0$		
1.3	$P = \sqrt{\frac{9}{11 - (15)}} = \sqrt{-\frac{9}{4}}$ $x = 15$	✓ answer (1	l)
	X = 13	[.	[4]

QUESTION 2

2.1.1	$xy^2 + 3x^2y = xy(y+3x)$	✓ answer	(1)
2.1.2	$x^2 - 7x - 18 = (x - 9)(x + 2)$	$\checkmark\checkmark(x-9)(x+2)$	(2)
2.1.3	$x^{2}y-16+4y-4x^{2} = x^{2}y-4x^{2}+4y-16$ $= x^{2}(y-4)+4(y-4)$ $= (x^{2}+4)(y-4)$	✓ grouping ✓ common factor ✓ answer	(3)
2.2.1	$(2x-1)(x^2-3x+1) = 2x^3 + 6x^2 + 2x - x^2 + 3x - 1$ $= 2x^3 + 5x^2 + 5x - 1$	$\checkmark 2x^3 + 6x^2 + 2x$ $\checkmark -x^2 + 3x - 1$ $\checkmark \text{ answer}$	(3)
2.2.2	$\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 4^{n-1} \cdot 12^{-3n}} = \frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot (2^2)^{n-1} (3 \cdot 2^2)^{-3n}}$ $\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot (2^2)^{n-1} (3 \cdot 2^2)^{-3n}} = \frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 2^{2n-2} \cdot 3^{-3n} \cdot 2^{-6n}}$ $\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 2^{2n-2} \cdot 3^{-3n} \cdot 2^{-6n}} = 2^{-2n-(2n+2n-2-6n)} \cdot 3^{-3n-(-3n)}$ $2^{-2n-(2n+2n-2-6n)} \cdot 3^{-3n-(-3n)} = 2^{-2n+2n+2} \cdot 3^{-3n+3n}$ $2^{-2n+2n+2} \cdot 3^{-3n+3n} = 2^2 \cdot 3^0$ $2^2 \cdot 3^0 = 4 \times 1 = 4$	✓ prime numbers (base ✓ simplification (addir subtracting the exponent ✓ 2 ⁻²ⁿ⁺²ⁿ⁺² .3 ⁻³ⁿ⁺³ⁿ ✓ answer	es)
			[13]

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3.1	$5^{x+2} = 1$ $5^{x+2} = 5^{0}$ $x + 2 = 0$ $x = -2$	✓ equating exponents ✓ answer	(2)
3.2	$3^{3x+2} = 27$ $3^{3x+2} = 3^{3}$ $3x + 2 = 3$ $3x = 1$ $x = \frac{1}{3}$	✓ same bases ✓ equating exponents ✓ answer	(3)
3.3	$2^{x+1} - 2^{x} = 16$ $2^{x+1} - 2^{x} = 16$ $2^{x} \cdot 2 - 2^{x} = 16$ $2^{x} (2-1) = 16$ $2^{x} = 2^{4}$ $x = 4$	✓ common factor ✓ equating exponents ✓ answer	(3)
			[08]

