education

Department of Education
FREE STATE PROVINCE

GRADE 11

MATHEMATICS

GRADE 11

INFORMAL TEST 5

TERM 1

19 FEBRUARY 2024

MARKS: 25

DURATION: 30 MINUTES

This question paper consists of 3 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of TWO 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, 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

QUESTION 1

1.1 Solve for x, in each of the following:

1.1.1 $2x^2 - 7x = 0$ (3)

1.1.2 $2x(x - 3) = 1$ (Leave your answer correct to TWO decimal places.) (4)

1.1.3 $\sqrt{1+x} + 5 = x$ (5)

1.1.4 $(x - 3)(2 - x) > 0$ (3)

1.2 Solve for x and y simultaneously

$x^2 - 2xy - 3y^2 = 0$ and $3x + y - 2 = 0$ (6)

[21]

QUESTION 2

Simplify:

2.1 $\dfrac{10^{n+3}.5^{n-1}}{50^{n+2}}$ (4)

[4]

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NATIONAL SENIOR CERTIFICATE

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2024 INFORMAL TEST 5

MARKING GUIDELINE

This marking guideline consists of 4 pages

QUESTION 1

1.1.1	$2x^2 - 7x = 0$ $2x(x-7) = 0$	✓ $x = 7$ ✓ $x = 0$ (2)
1.1.2	$2x(x-3) = 1$ $2x^2 - 6x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-1)}}{2(2)}$ $x = \frac{6 \pm \sqrt{44}}{4}$ $x = 3{,}16$ or $x = -0{,}16$	✓standard form ✓substitution ✓ $x = \frac{6 \pm \sqrt{44}}{4}$ ✓✓ answers (4)
1.1.4	$(x-3)(2-x) > 0$ $(x-3)(x-2) < 0$ CV: 2 and 3	✓ $(x-3)(x-2) < 0$ ✓ ✓ solution (3)
1.1.3	$\sqrt{1+x} + 5 = x$ $\sqrt{1+x} = x - 5$ $\left(\sqrt{1+x}\right)^2 = (x-5)^2$ $1 + x = x^2 - 10x + 25$ $x^2 - 11x + 24 = 0$ $(x-8)(x-3) = 0$ $x = 8$ or $x = 3$ $\therefore x = 8$	✓ squaring both sides ✓ standard form ✓ factors ✓ both answers ✓ $x = 8$ (5)
1.2	$x^2 - 2xy - 3y^2 = 0$ and $3x + y - 2 = 0$ $3x + y - 2 = 0$ and ..... (i) and $x^2 - 2xy - 3y^2 = 0$ ..... (ii) $y = -3x + 2$ ..... (iii) $x^2 - 2x(-3x+2) - 3(-3x+2)^2 = 0$ $x^2 - 2x(-3x+2) - 3(-3x+2)^2 = 0$ $x^2 + 6x^2 - 4x - 3(9x^2 - 12x + 4) = 0$ $7x^2 - 4x - 27x^2 + 36x - 12 = 0$ $-20x^2 + 32x - 12 = 0$ $5x^2 - 8x + 3 = 0$ $(5x-1)(x-3) = 0$ $x = \frac{1}{5}$ or $x = 3$ $y = -3\left(\frac{1}{5}\right) + 2 = \frac{7}{5}$ or $y = -3(3) + 2 = -7$	✓ $y = -3x + 2$ ✓ subs. ✓ standard form ✓ factors ✓ both x- values ✓ both y-values (6)
		[21]

QUESTION 2

2	$\frac{10^{n+3}.5^{n-1}}{50^{n+2}} = \frac{(5\times 2)^{n+3}.5^{n-1}}{(5^2\times 2)^{n+2}}$ $= \frac{(5\times 2)^{n+3}.5^{n-1}}{(5^2\times 2)^{n+2}}$ $= \frac{5^{n+3}\times 2^{n+3}.5^{n-1}}{5^{2n+4}.2^{n+2}}$ $= 5^{2n+2-(2n+4)}.2^{n+3-(n+2)}$ $= 5^{2n+2-2n-4}.2^{n+3-n-2}$ $= 5^{-2}.2$ $= \frac{2}{25}$	✓ bases as prime numbers ✓ simplification (adding exponents) ✓ simplification (subtracting exponents) ✓ answer (4)
		[4]