



education

Department of
Education
FREE STATE PROVINCE

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.

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



QUESTION 1

1.1 Given that:

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

For which value(s) of x , is P

- 1.1.1 a rational number? (1)
 - 1.1.2 an irrational number? (2)
 - 1.1.3 non-real? (1)
- [4]

QUESTION 2

2.1 Factorise the following expressions fully:

2.1.1 $xy^2 + 3x^2y$ (1)

2.1.2 $x^2 - 7x - 18$ (2)

2.1.3 $x^2y - 16 + 4y - 4x^2$ (3)

2.2 Simplify the following expressions fully:

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

2.2.2 $\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 4^{n-1} \cdot 12^{-3n}}$ (4)

[13]

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]



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MARKING GUIDELINE

This marking guideline consists of 2 pages

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

QUESTION 2

2.1.1	$xy^2 + 3x^2y = xy(y + 3x)$	✓ answer (1)
2.1.2	$x^2 - 7x - 18 = (x-9)(x+2)$	✓✓ $(x-9)(x+2)$ (2)
2.1.3	$x^2y - 16 + 4y - 4x^2 = x^2y - 4x^2 + 4y - 16$ $= x^2(y-4) + 4(y-4)$ $= (x^2 + 4)(y-4)$	✓ grouping ✓ common factor ✓ answer (3)
2.2.1	$(2x-1)(x^2 - 3x + 1) = 2x^3 + 6x^2 + 2x - x^2 + 3x - 1$ $= 2x^3 + 5x^2 + 5x - 1$	✓ $2x^3 + 6x^2 + 2x$ ✓ $-x^2 + 3x - 1$ ✓ answer (3)
2.2.2	$\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 4^{n-1} \cdot 12^{-3n}} = \frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot (2^2)^{n-1} \cdot (3 \cdot 2^2)^{-3n}}$ $\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot (2^2)^{n-1} \cdot (3 \cdot 2^2)^{-3n}} = \frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 2^{2n-2} \cdot 3^{-3n} \cdot 2^{-6n}}$ $\frac{2^{-2n} \cdot 3^{-3n}}{2^{2n} \cdot 2^{2n-2} \cdot 3^{-3n} \cdot 2^{-6n}} = 2^{-2n-(2n+2n-2-6n)} \cdot 3^{-3n-(-3n)}$ $2^{-2n-(2n+2n-2-6n)} \cdot 3^{-3n-(-3n)} = 2^{-2n+2n+2} \cdot 3^{-3n+3n}$ $2^{-2n+2n+2} \cdot 3^{-3n+3n} = 2^2 \cdot 3^0$ $2^2 \cdot 3^0 = 4 \times 1 = 4$	✓ prime numbers (bases) ✓ simplification (adding & subtracting the exponents) ✓ $2^{-2n+2n+2} \cdot 3^{-3n+3n}$ ✓ answer (4)
		[13]

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]

