



Gr. 11

Technical Mathematics – Paper 1

Formal test – Term 2

Total: 100 points

Time: 2 hours

Learner's name: _____ Gr. 11: _____

Instructions and information:

- This paper consists of two questions, answer both questions.
- The use of a calculator is not permitted.
- No Tip – Ex may be used.
- Show all the steps needed to arrive at the answer.
- Strength!!

Content covered in this paper

- Algebra and logarithms
- Solve equations and applications
- Function analysis
- Rational functions
- Circle and hyperbola

QUESTION 1

1.1 Simplified, the complete WITHOUT the use of a calculator.

$$1.1.1 \quad (3\sqrt{3} - x^2)^2 \quad (2)$$

$$1.1.2 \quad \frac{2x^2 - 5x + 2}{x^2 - 4} \quad (3)$$

$$1.1.3 \quad (\sqrt{3} - 1)(\sqrt{3} + 1) \quad (3)$$

$$1.1.4 \quad \frac{x^2 - 4}{x^2 - 9} \quad (5)$$

$$1.2 \quad \text{Given } y = \frac{\sqrt{3x^2 + 4x + 4}}{x^2 + 1}$$

$$1.2.1 \quad \frac{d}{dx} \left(\frac{\sqrt{3x^2 + 4x + 4}}{x^2 + 1} \right) \quad (5)$$

1.2.2 Next, show that for y , areal numbers then are $x \in \mathbb{R}$ even numbers. (2)

1.3 Consider binary numbers $X = 100000_2$ and $Y = 111_2$

1.3.1 Write X and Y in decimal form. (2)

1.3.2 Next, determine $(X - Y)$ in binary form. (2)

[24]

QUESTION 2

2.1 Solve for $x \in \mathbb{R}$, WITHOUT using a calculator

$$2.1.1 \quad \frac{x^2 - 4}{x^2 - 9} = \frac{x + 2}{x - 3} \quad (4)$$

$$2.1.2 \quad \frac{x^2 - 4}{x^2 - 9} = \frac{x + 2}{x - 3} \quad (5)$$

$$2.1.3 \quad \log_2 8 = -1 \quad (3)$$

$$2.1.4 \quad \frac{1}{x^2 - 4} = \frac{1}{x^2 - 9} \quad (7)$$

2.2 Show that:

$$5 \cdot 2^{2x-3} + 2^{2x-3} = \frac{1}{2^{2x-3}} \quad (5)$$

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