GRADE 11 MATHEMATICS
NOVEMBER EXAMINATION PAPER 1

QUESTION 1

1.1 Solve for x:

    1.1.1 $x^2 - 5x - 6 = 0$ (2)

    1.1.2 $(2x - 3)(x + 1) = 9$ (3)

    1.1.3 $x - \sqrt{x - 1} = 3$ (4)

    1.1.4 $x(x + 10) > -25$ (4)

    1.1.5 $x^{\frac{2}{3}} = 4$ (3)

    1.1.6 $2^{2x} - 4^{x-2} = 12$ (4)

1.2 Simultaneously solve x and y:

    $2x - y = 1$ and $3x^2 - 4xy + y^2 = 0$ (6)

1.3 Solve the following inequalities:

    1.3.1 $x^2 + 5x - 6 > 0$ (3)

    1.3.2 $-3(x + 1)(x - 2) < 0$ (3)

    [31]

QUESTION 2

2.1 $x = -3 \pm 2\sqrt{2}$ are the roots of a quadratic function, $f(x)$, of which the y-intercept is 4. Determine $f(x)$.   (5)

2.2 Given: $g(x) = \frac{x^2 - 2x+1}{x - x}$

    2.2.1 For which values of x will $g(x)$ be undefined.   (2)

    2.2.2 Explain why $g(x)$ will never equal zero. (Show all your calculations).   (3)

2.3 Solve x if $\frac{2-x}{x+3} < 6$. Graphically represent your answer.   (5)

2.4 Simplify and leave an answer with positive exponents only:

    $\sqrt{\dfrac{y^4 \cdot 9^{x+1}}{27^{x-1}}}$ (4)

2.5 Without solving the equation, determine the nature of the roots of: $4x^2 = 2x + 1$ (5)

    [24]

QUESTION 3

3.1 The first three terms of a linear series, is given as: $3x - 2; x + 9; 2x + 5$

    3.1.1 Determine the value of x.   (3)

    3.1.2 Determine the numerical value of T_1.   (2)

3.2 Given the quadratic series: $-128; -94; -48; -28; \ldots$

    3.2.1 Determine the next two terms of the series.   (2)

    3.2.1 Determine T_n, the general term of the pattern.   (3)

    3.2.3 Given that $T_n = -4n^2 + 54n - 188$, determine the largest *possible* numerical value for T_n.   (4)

3.3 Given $T_n = 13 - 3n$:

    3.3.1 Which term in the series would be equal to -179.   (3)

    3.3.2 Determine the numerical value for the 11th term.   (2)

3.4 James and John look at the following patterns:

    Pattern 1   Pattern 2   Pattern 3

    James says if he increases the pattern number by one, square that number and then subtract the pattern number increased by one he will get the general formula.

    John says he can derive the general formula for the number of blocks by taking the number of columns in each pattern and multiplying it by the number of rows.

    Who is correct between James and John? Prove your answer.   (5)

    [24]

QUESTION 4

Given: $f(x) = \frac{-3}{x+2} - 1$ and $g(x) = -a^x$. The point $(1; -3)$ lies on g.

4.1 Determine the value of a.   (2)

4.2 Draw a neat sketch of the two graphs on the same axis. Show all intercepts with the axes and asymptote clearly.   (5)

4.3 Determine the axis of symmetry of f that has a positive gradient.   (2)

    [9]

Grade 11 Mathematics Paper 1

Richard Bailey

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