UNIVERSITY OF PERADENIYA

; **CENTRE FOR DISTANCE AND CONTINUING EDUCATION**

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கலைத்தேர்வுப் பரீட்சை (வெளிவாரி—புதிய பாடத்திட்டம்) 100 வது தேர்ச்சி மட்டம் –
புரட்டாதி 2024
Bachelor of Arts (External - New Syllabus) Examination 100 Level –May 2024
FNDE 102 Basic Mathematics

Instructions:

Answer any five (05) questions.   Time: Three (03) hours

Calculators are not allowed.   Total Marks: 100

1. (a) Simplify the following expressions.

    (i) $\dfrac{2^4 \times 12 \times 5^3}{64 \times 5}$

    (ii) $(x^2 y)^3 \div xy^4$

    (iii) $\dfrac{7}{10} \div \left(\dfrac{3}{5} + \dfrac{1}{3}\right)$ (02 marks each)

  (b) Nimal read two-fifths of a book which has 210 pages. How many more pages he has to read to complete the book?   (02 marks)

  (c) Solve the following equations for x.

    (i) $14x - 12 = 3x + 6 - 9x + 2$

    (ii) $(x + 7)^2 = 4$

    (iii) $2x^2 - 9x - 18 = 0$ (02 marks each)

  (d) Simplify the following expressions by factorizing them.

    (i) $\dfrac{3x^2 + 19x + 6}{x^2 - 36}$

    (ii) $\dfrac{8x^3 - 125}{2x - 5}$ (03 marks each)

                                                              (Total 20 marks)

2 (a) Represent each of the following graphically.

    (i). $x > -5$

    (ii). $-2 < x < 6$

    (iii). $x \le -4, x \ge 4$

                                                              (06 marks)

(b)   Solve the following inequality (the possible range of values for 'X').

$$|x + 2| < 3$$ (04 marks)

(b)   Solve the following simultaneous linear equations algebraically.
$$3x - 2y = 7$$

$$6x + 5y = 23$$ (06 marks)

(c)   Sketch the graphs of the equations in (b) and verify your answers to (b).

                                                             (04 marks)
                                                         (Total 20 marks)

3   (a)   Solve $x^2 + 9x - 22 = 0$ by using the quadratic formula.   (06 marks)

     (b)   Consider the quadratic function $y = x^2 + 9x - 22$
           (i) Sketch the graph showing all important features of it.   (06 marks)
           (ii) Describe the shape of the graph.   (02 marks)
           (iii) Does this function have stationary points? If yes, indicate them.

                                                                            (02 marks)
           (iv) Find the equation of the line of symmetry.   (04 marks)

                                                         (Total 20 marks)

4.   (a)   Consider the linear equation $3y + 4x = 11$. Find the slope and intercept of this line
           and draw it in a graph.
     (b)   Find the equation of the straight line that goes through the points $(1, 3)$ and $(5, 2)$.

     (c)   Find the equation of the line with slope 3 that passes through the point $(-1, 3)$.

     (d)   Solve the system of inequalities by graphing $y \le 4$ and $x \le 1$

     (e)   Find the equation of the line parallel to $Y = -5x + 1$ that passes through the points $(3, 6)$.
                                                             (04 marks each)
                                                         (Total 20 marks)

5.   Find the first derivative of each of the functions with respect to x.
     (a) $$y = x^2 + 2x - \frac{1}{x^2}$$

     (b) $$y = (3x^2 + 2x + 1)e^{-3x}$$

     (c) $$y = \frac{x^2 + 9x + 2}{(2x + 1)}$$

     (d) $$y = \ln(2x^2 + 3)^4$$
                                                             (05 marks each)
                                                         (Total 20 marks)