



UNIVERSITY OF PERADENIYA
දුරස්ථ හා අඛණ්ඩ අධ්‍යාපන කේන්ද්‍රය
தொடர் தொலைக் கல்வி நிலையம்
CENTRE FOR DISTANCE AND CONTINUING EDUCATION



පළමු වසර ශාස්ත්‍රවේදී උපාධි පරීක්ෂණය (බාහිර-නව නිර්දේශය) දෙසැම්බර් 2018
முதலாம் வருட (100 LEVEL) கலைத்தேர்வுப் பரீட்சை (வெளிவாரி - புதிய
பாடத்திட்டம்) மார்ச்சு - 2018

1st YEAR (100 LEVEL) EXAMINATION IN BACHELOR OF ARTS
(EXTERNAL - NEW SYLLABUS) DECEMBER 2018

FNDE 102 - Basic Mathematics

Instructions:

1. There are eight (08) questions in this paper. Answer any five (05) questions.
2. Time: Three (03) hours.
3. Calculators are not allowed.
4. Total marks: 100

1. (a) Simplify the following.

(i) $\frac{x^2 y}{2xy^2}$ (ii) $\frac{(\sqrt{2x})^4}{(4x^2 y^2)^3}$ (iii) $\frac{(5a^3)^4}{25a^2}$ (iv) $\sqrt{49x^6 y^4}$

(2.5 marks each)

(b) Factorize the following polynomials.

(i) $x^2 - 36y^2$ (iv) $3xy - 9y^2$
(ii) $16x^3 - 54$ (v) $16x^2 - 24x - 160$
(iii) $3x^2 + 10x + 8$

(02 marks each)

2. (a) Solve the following.

(i) $5x + 9 = 3x - 7$
(ii) $\frac{3x + 2}{2} = \frac{x - 1}{4}$

(05 marks each)

(b) Draw the following inequalities in a number line.

(i) $-2 \leq x \leq 2$ (ii) $x \leq 0$ or $x \geq 3$

(04 marks)

(c) Solve the following inequalities and graph the solutions.

(i) $5 - 2x \geq x + 4$
(i) $5(1 - 3x) \geq 8$

(03 marks each)

3. (a) Solve the following simultaneous equations. Verify your solution by drawing the equations in a graph.

$x + 2y = 4$
 $3x - y = 5$

(10 marks)

(b) A child bought two types of toffees. Price of one type of toffees is Rs. 2 each and the other type of toffees cost Rs. 3 each. If the child has bought 15 toffees and the total cost of toffees is Rs. 38, how many toffees from each of the types were purchased?

(10 marks)

4. Consider the function $y = x^2 + 2x - 3$ where for $-3 \leq x \leq 3$
- (a) Verify whether the graph of the function takes a U-shape or an inverted U-shape. (04 marks)
- (b) Find the stationary points of the function if any. (06 marks)
- (c) Draw the graph of the function. (10 marks)

5. Solve the following limits.

(a) $\lim_{x \rightarrow 2} \frac{2x^2 - 8}{x - 2}$

(c) $\lim_{x \rightarrow 0} \frac{(x+2)^2 - 4}{x}$

(b) $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x + 1}{x^2 + 4x + 5}$

(d) $\lim_{x \rightarrow 1} \frac{(x^2 + 4x + 3)}{(x + 3)}$

(05 marks each)

6. Differentiate the following functions.

(a) $y = 2x^5 + 7x^{1/2} + \frac{1}{x^3}$

(d) $y = x^3 e^{3x}$

(b) $y = (2x^2 + 1)(4x + 3)$

(e) $y = \ln(2x)$

(c) $y = \frac{x^2 + 5x - 3}{3x^2}$

(04 marks each)

7. Integrate the following functions.

(a) $\int (x^4 - 6x^{1/2}) dx$

(b) $\int 2e^{4x} dx$

(c) $\int (1 - 2x)^3 dx$

(d) $\int \frac{13x}{7x^2 + 5} dx$

(e) Use the substitution $u = x^2 - 4x + 5$ to evaluate $\int \frac{x-2}{x^2 - 4x + 5} dx$ (04 marks each)

8. (a) In a class of 43 students, 12 play football and 7 play rugby and 5 play both football and rugby. A student is chosen at randomly. Find the probability that the student,
- (i). Plays football.
- (ii). Plays both.
- (iii). Plays football or rugby.
- (iv). Plays neither of these sports. (10 marks)

- (b) A box contains 4 blue and 3 yellow buttons of the same size. Two buttons are randomly selected from the box without replacement. Find the probability that
- (i). Both are yellow.
- (ii). The first is yellow and the second is blue. (10 marks)