Pacific Leaders' Educational Assistance
for
Development of States (Pacific-LEADS)
(1st Batch)

Examination for Mathematics (45 min.)

Note:

1. Rules of Examination
   - Do not leave the room without proctor's permission.
   - Do not take this question booklet out of the room.
   - No calculators are allowed.
   - Show all your work in blank spaces and write your answers in the space provided.

2. Instruction for the Question booklet
   - Do not open this question booklet until instructed.
   - Do not remove the staples from this booklet.
   - After being instructed, write your registration number and name in the space provided below.
   - If your question booklet is missing any pages, raise your hand.
   - This question booklet consists of 2 parts (Part1 and Part 2). You are requested to answer all the questions.

Registration No.	
Name	

(Type 1)

Part 1

Write down your answer for each question.

(1) Calculate $3 - \{2 - (3 - 5)\}$.

Answer: -1

(2) Calculate $\frac{1}{2} \times \left(1 - \frac{1}{3}\right) + \frac{2}{3}$.

Answer: 1

(3) Calculate $\left(2^6 \times \left(\frac{1}{4}\right)^{-2}\right)^{\frac{1}{5}}$.

Answer: $2^2 = 4$

(4) Solve $-3x = -10 + 2x$ for x.

Answer: $x = 2$

(5) Solve $\frac{1}{2} = \frac{2}{x} - 1$ for x.

Answer: $x = \frac{4}{3}$

(6) Solve $x - y = 3$ and $-2x + y = 2$ for x and y.

Answer: $x = -5, y = -8$

(7) Solve $(x - 5)x + 6 = 0$ for x.

Answer: $x = 2, 3$

(8) Suppose that the average of the four values, $\{-2, -x, 2x, 9\}$, is equal to $2x$. Find the value of x.

Answer: $x = 1$

Part 2

Write down your answer for each question.

(9) Find the region of x satisfying $x^2 - 3x \le 0$.

Answer: $0 \le x \le 3$

(10) Solve $\log_2(2x - 2) = 0$.

Answer: $x = \dfrac{3}{2}$

(11) Find the region of x satisfying $\dfrac{1}{3} < \left(\dfrac{1}{3}\right)^x < 1$.

Answer: $0 < x < 1$

(12) Find the value of n satisfying

$$\sum_{k=1}^{n} k = 10n$$

Answer: $n = 19$

(13) Find the first-derivative of $y = 5x(x - 1) + 3$.

Answer: $y' = 10x - 5$

(14) Find the definite integral:

$$\int_0^2 x^2 \, dx$$

Answer: $\frac{8}{3}$

(15) Let $A = \begin{bmatrix} x & 4 \\ 1 & x \end{bmatrix}$. Suppose the determinant of A is zero, so that A is not invertible. Solve for x.

Answer: $x = -2, 2$

(16) The profit of a firm is described by $\pi = (10 - q)q - 2q$, where q is the output. Find the output q that maximizes the profit π.

Answer: $q = 4$