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 2)

Part 1

Write down your answer for each question.

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

Answer: 6

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

Answer: $-\frac{1}{3}$

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

Answer: $2^3 = 8$

(4) Solve $x = 20 + 6x$ for x.

Answer: $x = -4$

(5) Solve $\frac{1}{3} = \frac{2}{x} - 2$ for x.

Answer: $x = \frac{6}{7}$

(6) Solve $2x - y = 7$ and $-x + 2y = 1$ for x and y.

Answer: $x = 5, y = 3$

(7) Solve $x(x - 1) = 6$ for x.

Answer: $x = -2,\ 3$

(8) Suppose that the average of the four values, $\{-1,\ x, -2x,\ 3\}$, is equal to $x - 1$. Find the value of x.

Answer: $x = \frac{6}{5}$

Part 2

Write down your answer for each question.

(9) Find the region of x satisfying $x^2 + 3x - 10 \leq 0$.

Answer: $-5 \leq x \leq 2$

(10) Solve $10^{5-3x} = 1$.

Answer: $x = \frac{5}{3}$

(11) Find the region of x satisfying $\log_{10}(x - 1) < 0$.

Answer: $1 < x < 2$

(12) Find the value of n satisfying

$$2 \times \sum_{k=1}^{n} k = n + 81$$

Answer: $n = 9$

(13) Find the first-derivative of $y = \sqrt{x} + 1$.

Answer: $y' = \frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}}$

(14) Find the definite integral:

$$\int_0^4 (x - 1)\, dx$$

Answer: 4

(15) Let $A = \begin{bmatrix} 5 & -4 \\ 1 & -1 \end{bmatrix}$. Find the inverse matrix of A.

Answer: $A^{-1} = \begin{bmatrix} 1 & -4 \\ 1 & -5 \end{bmatrix}$

(16) The production cost is described by $c = (q - 10)q + 20$, where q is the output. Find the output q that minimizes the cost c.

Answer: $q = 5$