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:
_____

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

Answer:
_____

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

Answer:
_____

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

Answer:
_____

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

Answer: _____

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

Answer: _____

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

Answer: _____

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

Answer: _____

Part 2

Write down your answer for each question.

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

Answer:
_____

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

Answer:
_____

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

Answer:
_____

(12) Find the value of n satisfying

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

Answer:
_____

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

Answer:

(14) Find the definite integral:

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

Answer:

(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:

(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: