

2020 IUT Admission Test(SOCIE)
Math Examination(Sample)

<Essay Types> Applicants should write detailed solving process. If there is no solution, you will receive 0 points regardless of the correct answer.

○ The point for each question is indicated next to each question number.

1. [10 points]

Find the sum of solutions to

$$\sqrt{x+2} + \sqrt{8-x} = 4.$$

2. [10 points]

Find the sum of all natural numbers which satisfy the following inequality equation

$$\frac{(n-2)(n-5)}{(n-3)} \leq 0.$$

3. [10 points]

Find the sum of all solutions of

$$\log_2(x^2 + 5x + 12) - \log_2(x + 5) = 1.$$

4. [20 points]

When $f(x)$ is a differentiable function

satisfying $\lim_{x \rightarrow \pi} \frac{f(x)}{x - \pi} = 3$, find

$$\lim_{x \rightarrow \pi} \frac{\sin(2f(x))}{x - \pi}.$$

5. [20 points]

Compute $\int_0^{\pi} |x \cos x| dx$.

6. [30 points]

When $f(x) = \cos\left(\frac{x}{2}\right) + \int_0^{\pi} t f'(t) dt$, find

$$f\left(\frac{\pi}{2}\right).$$