Math Examination (Sample)

< Multiple choice Types > There is only one correct answer per each question. Mark your answer choice on the OMR answer sheet.

○ For each correct answer, you will get the points indicated next to each question number.

○ No penalty point is applied to an incorrect answer.

1. Simplify $\log_2 3 \times \log_5 8 \times \log_9 5$.

① 1   ② $\dfrac{3}{2}$ ③ 2   ④ $\dfrac{5}{2}$ ⑤ 3

2. Let $A = \begin{pmatrix} 1 & 2 \\ -1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 1 \\ 2 & 2 \end{pmatrix}$. When $A\,(B^{-1})^2 = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, find $a + b + c + d$.

① $\dfrac{3}{16}$ ② $\dfrac{1}{4}$ ③ $\dfrac{5}{16}$ ④ $\dfrac{3}{8}$ ⑤ $\dfrac{7}{16}$

3. When $\omega = \dfrac{1}{1 + \sqrt{3}\,i}$, find ω^6.

① $-\dfrac{1}{64}$ ② $-\dfrac{1}{8}$ ③ i ④ $\dfrac{1}{8}$ ⑤ $\dfrac{1}{64}$

4. Find $\cos\left(\dfrac{19\pi}{12}\right)$.

① $\dfrac{\sqrt{6} - 1}{4}$ ② $\dfrac{\sqrt{6} - \sqrt{2}}{4}$ ③ $\dfrac{\sqrt{6} - \sqrt{3}}{4}$

④ $\dfrac{\sqrt{6} - 2}{4}$ ⑤ $\dfrac{\sqrt{6} - \sqrt{5}}{4}$

5. When M and m are the maximum and minimum values of $f(x) = 2x^3 - 3x^2 - 12x + 5$, $(-2 \le x \le 2)$, find $M + m$.

① -3 ② -1 ③ 0   ④ 1   ⑤ 3

6. Find $\displaystyle\int_0^1 x^2\,(2x^3 + 1)^3\,dx$.

① 2   ② $\dfrac{7}{3}$ ③ $\dfrac{8}{3}$ ④ $\dfrac{10}{3}$ ⑤ 4