

2025 年度日本政府(文部科学省)奨学金留学生選考試験

QUALIFYING EXAMINATION FOR APPLICANTS FOR THE JAPANESE
GOVERNMENT (MEXT) SCHOLARSHIP 2025

学科試験 問題

EXAMINATION QUESTIONS

(専修学校留学生)

SPECIAL TRAINING COLLEGE STUDENTS

数 学

MATHEMATICS

注意 ☆試験時間は 60 分。

PLEASE NOTE: THE TEST PERIOD IS 60 MINUTES.

Nationality		No.		Marks	
Name	(Please write your full name, underlining your family name)				

Answer the following questions and fill in your responses in the corresponding boxes on the answer sheet.

1. Fill in the blanks with the correct numbers.

(1) When $x = \sqrt{2} - 1$, compute the following formula,

$$x^2 + \frac{1}{x^2} = \boxed{}.$$

(2) Simplify the following formula.

$$\sin 10^\circ \cos 80^\circ - \sin 100^\circ \cos 170^\circ = \boxed{}.$$

(3) Solve the following equation

$$|x + 2| = 4.$$

Solutions are $x = \boxed{\textcircled{1}}$ and $x = \boxed{\textcircled{2}}$.

(4) The coordinate of the vertex of the parabola $y = x^2 - 2x - 3$ is

$$\left(\boxed{\textcircled{1}}, \boxed{\textcircled{2}} \right).$$

2. Fill the following blanks with the suitable numbers.

- (1) One bag contains 8 blue balls and 6 green balls. Another bag contains 7 blue balls and 5 green balls. If one ball is drawn from each bag, the probability that both are blue is .

- (2) The total number of positive divisors of 1400 is ,
- and the whole sum of positive divisors of 1400 is .

3. Fill in the following blanks with the suitable numbers.

- (1) Simplify the following formula.

$$\log_2 3 \cdot \log_3 4 \cdot \log_4 2 = \text{}.$$

- (2) One of the solutions of the cubic equation $x^3 - 7x - 6 = 0$ is $x = -1$, then other solutions are $x = \text{$ and $x = \text{$.

- (3) Let $f(x) = x^2 - x^3$. Consider the curve $y = f(x)$ on the xy -plane. The equation of its tangent line at the point $(2, f(2))$ is $y = \text{$ $x + \text{$.

- (4) The area bounded by $y = x^2 + 3$, x -axis, $x = -1$ and $x = 2$ on the xy -plane is .

- (5) Assume that $a^{\frac{1}{2}} + a^{-\frac{1}{2}} = 3$. Then, $a + a^{-1} = \text{$.

4. Fill in the following blanks with the suitable numbers.

(1) Let $\{a_n\}$ be an arithmetic progression. When $a_3 = 6$, $a_6 = 18$,

then $a_{12} =$.

(2) Compute following summations.

$$\sum_{n=1}^{10} (1 - 3n) =$$
 ①.

$$\sum_{n=1}^{19} \frac{1}{n(n+1)} =$$
 ②.