Japanese Grant Aid for Human Resource Development Scholarship (JDS)

Basic Mathematics Aptitude Test

2024

Prepared by Japan Development Service Co., Ltd.

Note:

- You have 60 minutes to complete.
- No calculators are allowed.
- Show all your work and write your answers in the designated space.
- Part I is 'Basic Math' and Part II is 'Applied Math.'
- The test result is only for the reference purpose and basically does not affect the selection procedure. However, some accepting universities may require the candidates who apply for the economics-related fields of study to have analytical and numerical skills.

Registration No.: _____

Name: _____

(Please show all your work here and write your answers in the designated space)

[PART I]

1. Calculate.

$-2+5-9$

$-4.7+8.5$

$5-9\div\frac{1}{3}$

$0.6+\frac{1}{4}-1$

$$\frac{7}{2} \times -\frac{3}{7} \div \frac{3}{4}$$

$$(3-\sqrt{7})(2+\sqrt{7})$$

$$(\sqrt{5}-2)^2$$

$$3^2 \div 3^{-3} \div 3^4$$

$$\left(3^5 \times \left(\frac{1}{3}\right)^3 \times 3^3\right)^{\frac{2}{5}} \div \frac{1}{3^2}$$

2. Solve the following equations or inequality.

$x + 5 = \frac{x}{3} + 3$

$\begin{cases} 5x + 3y = 4 \\ x - y = 4 \end{cases}$

$-4x + 16 > 0$

3. Factorize the following quadratic equation. If not possible, use the solution formula to solve it.

$x^2 - 5x + 6 = 0$

$x^2 - 8x = -3$

Expand the following formula.

$(2x + 3)(3x - 4)$

4. When $a = 3$ and $b = -\frac{1}{4}$, what is the value of

$$a^2 + \frac{2}{b} - \frac{4}{3}ab - 4b^2$$

5. Determine the first derivative of

$$f(x) = -3x^3 - 4x^2 + 6x + 35$$

6. When $x = a$, find the first derivative of

$$f(x) = 4x^3 - 3x$$

7. Find definite integral of

$$\int_0^2 (4x^2 - 2x + 5)\, dx$$

8. Find definite integral of

$$\int_1^3 (4x - 5)\, dx$$

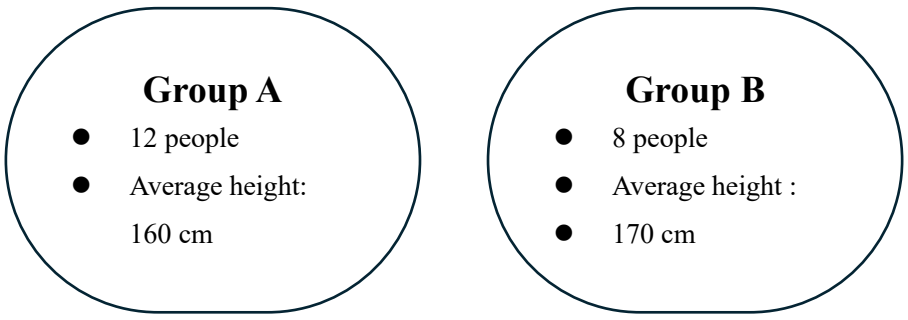
(Please show all your work here and write your answers in the designated space)

[PART II]

1. The points on a plane coordinate, $(-6, 2)$, $(4, -3)$, and $(6, \boldsymbol{a})$, lie on the same line. Find the value $\boldsymbol{a}$.

2. Round off 53.89 **AT** the first decimal place.

3. Calculate the average height of the **WHOLE** people.



4. There are 6 values below.

$$\left\{-\frac{4}{5}, \quad 0, \quad -\frac{3}{4}, \quad \frac{5}{4}, \quad \sqrt{2}, \quad -0.70\right\}$$

(1) Find the maximum value.

(2) Find the minimum value.

(3) Calculate the average of the six values.

5. The table below shows a survey result of spending time for voluntary activities each week. Answer the following questions.

Spending time (hours)	***Number of People***
0 to less than 1	7
1 to less than 2	1
2 to less than 3	3
3 to less than 4	5
4 to less than 5	3
5 to less than 6	0
6 to less than 7	1

(1) How many people are in the group 1 ~ 3 hours?

(2) How many people spent 4 hours or more?

(3) What percentage of the people spent less than 3 hours ?

(4) Find the average amount of time spent on voluntary activities.