

The Project for Human Resource Development Scholarship (JDS)

Basic Mathematics Aptitude Test 2023

Note:

- The test is a computer-scored multiple-choice test.
- You have 60 minutes to complete.
- No calculators are allowed.
- Part I and Part II are 'Basic Math,' and Part III, IV and V are 'Applied Math.'
- Select one(1) integer 0 to 9 for each square.
- Each square correspond to each answer number of computer-scored answer sheet.

Example:

Please select integer number that correspond to

➤ $3 \times 8 =$

(2digits)

No.1 No.2

Fill the oval shape completely by a pencil that you think it is the appropriate answer as shown in the picture below.

No.	Answer
1	(1) (2) (3) (4) (5) (6) (7) (8) (9) (0)
2	(1) (2) (3) (4) (5) (6) (7) (8) (9) (0)
3	(1) (2) (3) (4) (5) (6) (7) (8) (9) (0)
4	(1) (2) (3) (4) (5) (6) (7) (8) (9) (0)

Name : _____

[PART I] Calculate the followings:

1. $3 - (3 - 3 \times (2 + (5 - 7)))$

Answer :

No.1

2. $\frac{3}{5} \div \left(\frac{2}{5} - 0.25\right) + \left(1.5 \div \frac{3}{4}\right) \div \left(\frac{3}{10} - \frac{4}{5}\right)$

Answer :

No.2

3. $(\sqrt{24} - \sqrt{54}) \times \sqrt{6}$

Answer :

-

No.3

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

Answer :

$\frac{1}{(2 \text{ digits})}$

No.4

No.5

[PART II] Answer the following questions:

1. Solve the following equations: $2x + 1 = 5x - 8$

Answer : $x = \boxed{}$

↪ No.6

2. Solve the following simultaneous equations for x and y .

$$2x + 3y - 2 = 5$$

$$-x + 4y = 2$$

Answer : $x = \boxed{}$, $y = \boxed{}$

↪ No.7

↪ No.8

3. Find the region x satisfying the following inequality, where $| |$ indicates the absolute value.

$$\left| \frac{3x-1}{2} \right| < 1$$

Answer : $-\frac{1}{\boxed{}} < x < 1$

↪ No.9

4. Find the difference between the arithmetic mean and median values in the following observations x_i : $Mean(x_i) - Median(x_i)$ where $x_i = \{14, 2, 7, 6, 3, 4\}$

Answer : $\boxed{}$

↪ No.10

[PART III] Answer the following questions:

1. Solve the following equation for x .

$$\frac{4x^2}{3} - 4 = 8$$

Answer : $x = \pm \boxed{}$

No.11

2. Find the region of x satisfying the following inequality.

$$x^2 + 2x < -4x - 5$$

Answer : $-\boxed{} < x < -\boxed{}$

No.12

No.13

3. Solve the following equation for x .

$$2\log_2(x) = \log_2(6 - 5x)$$

Answer : $x = \boxed{}$

No.14

4. Consider the following six values, [3, 2, 1, 10, 9, 5]. Suppose that the median of six values is 2^{3x} . Find the value of x .

Answer : $x = \frac{\boxed{}}{\boxed{}}$

No.15

No.16

[PART IV] Answer the following questions:

1. Determine the first-order derivative of the following. Note that e is a mathematical constant which is the base of the natural logarithm.

$$y = \frac{1}{x} + \log_e x$$

Answer : $\frac{x - \boxed{}}{x^2}$ No.17

2. Find the following definite integral.

$$\int_0^3 (x + x^2) dx$$

Answer : $\frac{1 \boxed{}}{\boxed{}} + \frac{1}{\boxed{}}$ (2digits)

No.18 No.19

3. Let $A = \begin{bmatrix} a & -2 \\ -2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$.

Assume determinant of the matrix A is -1 . Find $A^{-1}B$.

Answer : $\begin{bmatrix} -\boxed{} & -\boxed{} \\ -3 & 0 \end{bmatrix}$ No.20 No.21

4. Find the value of x and y that solves the following constrained maximization problem:

Maximize $\sqrt{2xy}$ subject to $2x + y = 10$.

Answer : $x = \boxed{}$, $y = \boxed{}$ No.22

No.23 No.24

[PART V] Fill in the following blanks with correct answers:

1. Find the first derivative of the following.

$$f(\theta) = \sin\left(\frac{1}{2}\theta\right)$$

Answer : $\frac{1}{\boxed{}} \cos\left(\frac{1}{\boxed{}}\theta\right)$

No.25 No.26

2. Given a sequence 2^{n-1} , find the value $\sum_{n=1}^5 2^{n-1}$, where n is an integer.

Answer : $\boxed{} \boxed{}$ (2digits)

No.27 No.28

3. Suppose that $\vec{a} = (3x + 6, 3)$ and $\vec{b} = (2, y)$ are vertical and that $x + y = 1$. Find x and y .

Answer : $x = -\boxed{}, y = \boxed{}$

No.29 No.30

4. In a firm, there are 5 computer science degree holders and 3 marketing degree holders. The chief executive officer intends to create business analysis teams by selecting two members from each group of degree holders. Find the total number of different teams that can be formed.

Answer : $\boxed{} \boxed{}$ (2digits)

No.31 No.32