**MOCK TEST**

**I Complete using the correct option provided below (6).**

**Pigeonhole Principle**

The Pigeonhole Principle 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that if *n*+1 pigeons fly to *n* holes, there 2. \_\_\_\_\_\_\_\_\_ be a pigeonhole containing at least two pigeons. This apparently trivial principle is very 3. \_\_\_\_\_\_\_\_\_\_. The pigeonhole principle is an example of a counting argument which can be 4. \_\_\_\_\_\_\_\_\_\_\_ to many formal problems, including ones involving infinite sets that cannot be put into one-to-one correspondence.

The first statement of the principle is believed to have been made 5. \_\_\_\_\_\_\_\_\_\_\_ Dirichlet in 1834 under the name Schubfachprinzip ("drawer principle" or "shelf principle"). In Italian too, the original name "principio dei cassetti" is still in use; in some other languages (for example, Russian) this principle 6. \_\_\_\_\_\_\_\_\_\_ the Dirichlet principle (not to be confused with the minimum principle for harmonic functions of the same name). Let us 7. \_\_\_\_\_\_\_\_\_\_\_ some examples.

Example (Putnam 1978) 8. \_\_\_\_\_\_\_\_\_ *A* be any set of twenty integers 9. \_\_\_\_\_\_\_\_\_\_ from the arithmetic progression 1,4, . . . ,100. Prove that there must be two distinct integers in *A* whose sum is 104.

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: We partition the thirty-four elements of this progression 11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ nineteen groups {1},{52}, {4,100} , {7,97}, {10,94},. . . {49,55}. Since we are choosing twenty integers and we have nineteen sets, by the Pigeonhole Principle there must be two integers that belong 12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one of the pairs, which add to 104.

1. a) states b) is stated c) is stating d) statement

2. a) may b) might c) ought to d) must

3. a) power b) powerful c) powerless d) powered

4. a) application b) apply c) applied d) applicated

5. a) by b) from c) to d) on

6. a) calls b) call c) is called d) is calling

7. a) to see b) seeing c) see d) have seen

8. a) let b) must c) make d) take

9. a) choose b) chose c) is chosen d) chosen

10. a) solve b) salvation c) solution d) solving

11. a) on b) into c) from d) and

12. a) on b) to c) about d) at

**II Read the text and then do the exercises given below (5).**

**Babylonian mathematics**

Babylonian mathematics refers to any mathematics of the people of Mesopotamia (modern Iraq) from the days of the early Sumerians until the beginning of the Hellenistic period. It is named Babylonian mathematics due to the central role Babylon as a place of study, which ceased to exist during the Hellenistic period. From this point, Babylonian mathematics merged with Greek and Egyptian mathematics to give rise to Hellenistic mathematics. Later under the Arab Empire, Mesopotamia, especially Baghdad once again became an important centre of study for Islamic mathematics.

In contrast to the sparsity of sources in Egyptian mathematics, our knowledge of Babylonian mathematics is derived from more than 400 clay tablets unearthed since the 1850s. Written in Cuneiform script, tablets were inscribed whist the clay was moist and baked hard in an oven or by the heat of the sun. Some of these appear to be graded homework.

The earliest evidence of written mathematics dates back to the ancient Sumerians, who built the earliest civilization in Mesopotamia. They developed a complex system of metrology from 3000 BC. From around 2500 onwards, the Sumerians wrote multiplication tables on clay tablets and dealt with geometrical exercises and division problems. The earlies traces of the Babylonian mathematics also date back to this period.

The majority of recovered clay tablets date from 1800 to 1600 BC, and cover topic which include fractions, algebra, quadratic and cubic equations, and the calculation of reciprocal pairs. The tablets also include multiplication tables and methods for solving linear and quadratic equations. The Babylonian tablet YBC 7289 gives an approximation to √2 accurate to five decimals.

**a) Find synonyms in the text for the following words:**

to receive or obtain something from something else \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dig out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

because of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a slight sign that someone has been present or that something has happened \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

wet \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

condition of not having enough of something \_\_\_\_\_\_\_\_\_\_\_\_\_

to write or engrave \_\_\_\_\_\_\_\_\_\_\_\_\_

**b) Decide whether the following statements are true or false:**

1. Hellenistic mathematics predates Babylonian mathematics. \_\_\_\_\_\_\_\_\_\_

2. What we know of Babylonian mathematics is mostly based on the clay tablets written in cuneiform script. \_\_\_\_\_\_\_\_\_\_

3. Babylonians were familiar with the concept of square root. \_\_\_\_\_\_\_\_\_

**III Complete the text using one word per gap (4).**

**Algorithms**

\_\_\_\_\_\_\_\_\_ generally accepted formal definition of algorithm exists yet. We can, \_\_\_\_\_\_\_\_, derive and informal meaning of \_\_\_\_\_\_\_\_\_ word from the following quotation from Boolos and Jeffrey: “No human being can write fast \_\_\_\_\_\_\_\_\_\_ or small enough to list all members of \_\_\_\_\_\_\_\_\_\_ enumerably infinite set \_\_\_\_\_\_\_\_\_ writing out all their names, one after another, in some notation. But humans \_\_\_\_\_\_\_\_\_\_\_ do something equally useful, in the case of certain enumerably infinite sets – they can give explicit instructions \_\_\_\_\_\_\_\_\_\_ determining the nth member of the set, for arbitrary finite *n.*

**IV Put articles where needed (4).**

**Simple Arithmetic**

Incredibly, \_\_\_\_\_\_\_\_\_ great number theorist Ernst Kummer was so inept at \_\_\_\_\_\_\_\_\_ simple arithmetic that he often asked \_\_\_\_\_\_\_\_\_ students to help him in class. On one occasion, Kummer sought \_\_\_\_\_\_\_\_\_ result of a simple multiplication. "Seven times nine," he began. "Seven times nine is er - ah - ah - seven times nine is..."

"Sixty-one," \_\_\_\_\_\_\_\_\_ mischievous student suggested and Kummer wrote the "answer" on \_\_\_\_\_\_\_\_\_ blackboard.

"Sir," another one interrupted, "it should be sixty-nine."

"Come, come, \_\_\_\_\_\_\_\_\_ gentlemen, it can't be both," Kummer exclaimed. "It must be \_\_\_\_\_\_\_\_\_ one or the other!"

**V Match the equation with the operations performed to solve it (3).**

|  |  |
| --- | --- |
| 1. Clear the equation of fractions. | 1. Pure quadratic equations |
| 1. Use the quadratic formula. | 1. Equations involving fractions |
| 1. Raise both sides of an equation to a positive number. | 1. Equations involving radicals and fractional exponents |
| 1. Set each factor equal to zero. | 1. Equations that can be expressed in the factored form with zero on one side |
| 1. Cube both side of the equation. | 1. Equations involving cubic roots. |
| 1. Take a square root of both sides of the equation. | 1. Biquadratic equations written in the form ax4 + bx2 + c = 0 |

**VII Form adjective noun-collocations (3).**

|  |  |
| --- | --- |
| 1. Infinite | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solution |
| 1. unique | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ matrix |
| 1. inverse | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ triple |
| 1. dependent | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ interval |
| 1. ordered | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ system of equations |
| 1. nonzero | 1. a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ coefficient |

**VII Supply the missing prepositions (2.5).**

1. It is a linear equation \_\_\_\_\_\_\_\_\_\_\_\_ four unknowns
2. To solve the equation \_\_\_\_\_\_\_\_\_\_\_\_ terms \_\_\_\_\_\_\_\_\_\_\_ *y*
3. Multiply each element of A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *k*
4. Solve the equation \_\_\_\_\_\_\_\_\_\_\_\_ an unknown
5. Eliminate one of the unknowns \_\_\_\_\_\_\_\_\_\_\_\_ the second equation

**VIII Complete the sentences using the given words. One word is extra. (2.5)**

1. In order that the Cramer’s rule can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ must have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as variables.

*Applied different equations same system*

1. A one-to-one function is one in which \_\_\_\_\_\_\_\_\_ elements in the \_\_\_\_\_\_ should \_\_\_\_\_\_\_\_ give different values of *f.*

*always different domain similar*

1. The \_\_\_\_\_\_\_\_\_\_\_\_ expresses the \_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_ of one \_\_\_\_\_\_\_\_\_\_\_\_ with respect to another.

*change derivative quantity quality slope*

1. An inverse function is a function that is \_\_\_\_\_\_\_\_ from the given function by \_\_\_\_\_\_\_\_\_\_\_\_\_ the two \_\_\_\_\_\_\_\_\_\_\_.

*derived eliminating interchanging variables*

1. The right and left hand side of the equation constitute the same \_\_\_\_\_\_\_\_\_\_\_\_\_ but are expressed differently.

*parameter quantity expression*

**IX Grammar. Transform the sentences (10).**

1. “I gave an interesting lecture,” the teacher boasted.

The teacher boasted \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. She couldn’t understand the paper. Her colleague translated it for her.

She couldn’t understand the paper so she \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by her colleague.

1. They assume that the volume will increase.

The volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. A team of European scientists are doing the research.

The research \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. The result of their work was being discussed during a recent meeting.

They \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. How much has he deposited into his bank account?

How much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by him?

1. No one will be able to read your notes. Someone should type them for you.

No one will be able to read your notes so you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. They say that the value is derived from the above equation.

The value \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. They expect that a new law will be introduced next year.

A new law \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. “Have you seen this?” she wondered.

She wondered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**KEY:**

I 1. a) states, 2. d) must, 3. b) powerful, 4. c) applied, 5. a) by, 6. c) is called, 7. c) see, 8. a) let, 9. d) chosen, 10. c) solution, 11. b) into, 12. b) to

II derive, unearth, due to, trace, moist, sparsity, inscribe, F, T, T

III No, however (nevertheless), the, enough, an, by, can, for

IV the, /, /, the, a, the, /, /

V b, f, c, d, e, a

VI unique, inverse, ordered, infinite, dependent, non zero

VII in, in terms of, by, for, from

VIII 1. applied, system, same, equations, 2. different, domain, always, 3. derivative, change, quality, quantity, 4. derived, interchanging, 5. quantity

IX 1. The teacher boasted that he he/she had given an interesting lecture.

2. … she had it translated…

3. The volume is assumed to increase.

4. The research is being done by a team of European scientists.

5. They were discussing the result of their work during a recent meeting.

6. How much has been deposited into the bank account by him?

7. …so you should have them typed…

8. The value is said to be derived from the above equation.

9. A new law is expected to be introduced next year.

10. She wondered if we had seen that. (I/you/he/she/we/they)