

Sample test
Mathematics

Exercise 1. Vocabulary (18 points)

Fill the gaps in the below text with words of suggested meanings. In some cases the initial letters of required words are given.

Game theory is the (= *a division of an area of knowledge*) of applied mathematics that provides tools for analyzing situations in which parties, called players, make decisions that are interdependent.

This interdependence causes each player to c..... (= *to think about something carefully, especially in order to make a decision*) the other player's possible decisions, or strategies, in formulating his own strategy.

A s..... (= *the correct answer*) to a game describes the optimal decisions of the players, who may have similar, opposed, or mixed interests, and the o..... (= *the result or effect of an action or event, pl.*) that may result from these decisions.

Although game theory can be and has been used to a (= *to examine the nature or structure of something, especially by separating it into its parts, in order to understand or explain it*) parlour games, its applications are much broader.

Game theory is closely related to economics in that it seeks to find rational strategies in situations where the outcome depends not only on one's own strategy and "market conditions", but upon the strategies chosen by other players with possibly different or overlapping goals. It also finds wider a (= *practical use*) in fields such as political science and military strategy.

Other branches of mathematics, in particular probability, statistics and linear programming, are commonly used in conjunction with game theory to analyse many games. The results can be applied to simple games of entertainment or, having many i (= *possible effect or result of an action or a decision*) about the nature of human cooperation, to more significant aspects of life and society.

It would be surprising if any one theory could address such an e..... (= *extremely large*) range of "games," and in fact there is no single game theory. A number of theories have been p (= *suggested*), each applicable to different situations and each with its own concepts of what constitutes a solution.

Exercise 2. Vocabulary (9 points)

Fill each gap with one word (a preposition, an auxiliary, an article).

In mathematics, proof is a convincing demonstration (within the accepted standards of the field) that some mathematical statement is necessarily true. A proof must demonstrate that a statement is true in all cases, a single exception.

The statement that is proved is often called a theorem. Once a theorem is proved, it can be used as the basis to prove further statements. A theorem may also be referred to a lemma, especially if it is intended for use as a stepping stone in the proof another theorem. An unproven proposition that is believed to be true is known a conjecture. In fact, the vast majority proofs in written mathematics can be considered applications of rigorous informal logic. Purely formal proofs, written symbolic language instead natural language, are considered in proof theory.

Exercise 4. Terminology (15 points)

Put a suitable word or phrase into each gap.

1. of a set is notation when list of its elements is introduced, being separated by commas and enclosed within braces { }.
2. The result of a subtraction problem is called the
3. a natural number greater than 2 is not a prime number, then it is called a c..... number.
4. A is a line that has one end point and may be extended only in one direction.
5. A set containing only one element is called a
6. The set of natural numbers and zero yields the set of numbers.
7. Every even number is by number 2 with no remainder.
8. An angle having more than 90° but less than 180° is an angle.
9. The least of 2 and 3 is 6.
10. A triangle is a triangle in which all the sides have different length.
11. Two expressions joined together by an equality sign form an
12. A Cartesian coordinate system in a plane is formed by taking two mutually perpendicular real number lines intersecting at their origins (coordinate axes), one horizontal and one vertical, and then assigning unique of numbers (coordinates) to each point P in the plane.
13. If A is a subset of (but not equal to) B, then A is called a, in other words A subset which is not the same as the original set itself.
14. In a fraction, the indicates the number of equal parts into which the unit is to be divided.
15. Two sets that contain exactly the same number of elements are called sets.

Exercise 5. Word formation (18 points)

Put the verbs in the brackets into correct forms and/or parts of speech to complete the text.

A history of Zero

In around 500 AD Aryabhata devised a number system which was a (*position*) system. He used the word "kha" for position and it would be used later as the name for zero. There is (*evident*) that a dot had been used in earlier Indian manuscripts to denote an empty place in this (*to note*). We have an (*to inscribe*) on a stone which contains a date which corresponds to 876. We now come to considering the first (*to appear*) of zero as a number. From early times numbers are words which refer to collections of objects. (Certain) the idea of a number became more and more abstract and this abstraction then makes possible the (*to consider*) of zero and negative numbers which do not arise as properties of (*to collect – pl.*) of objects. Of course the problem which arises when one tries to consider zero and negatives as numbers is how they interact in regard to the (*to operate*) of arithmetic, addition, subtraction, multiplication and division.