بسم الله الرحمن الرحیم

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A. Multiple choice questions

Choose the correct answer to complete the sentence:

1. Which of the Iranian scholars worked on solving equation?

   a. Omar Khayam　b. Beiruni　c. Laplass　c. Ave Sina

2. Biruni's work in mathematics was mainly in the area of which one?

   a. Algebra　b. Arithmetic　c. Geometry　c. Analysis

3. If the greatest common divisor of m and n are 1, then m and n are said to be ....

   a. prime　b. relatively prime　c. composite　d. relatively composite

4. If the number m is not rational it is called ....

   a. prime　b. corational　c. irrational　d. coprime

5. If the number m is not even it is called ...

   a. coeven　b. evenless　c. evenly　a. odd

6. The general associativity of multiplication of natural numbers can be proved by .....

   a. vice–versa　b. symmetry　c. induction　d. inductivity

7. Every set which is not finite, is called ....

   a. definite　b. finitely　c. infinite　d. imfinite

8. The property that asserts that for every reals m and n only one of the relations m<n, m=n, and m>n holds, is called.....

   a. threeness property　b. thrichotomy　c. trichotomy　d. triness

9. The set Q of all rationals is not ..... , although it is an ordered field.

   a. completeness　b. infinite　c. complete　d. dense

10. If e is the identity element of a group G, then e is .....

    a. equal to 1　b. unique　c. equal to 0　d. unitary

11. The word known for the word "equal" is .....

    a. equally　b. inequal　c. equation　d. equaltion

12. Every element in a matrix is called a/an .....

    a. member　b. entry　c. numerator　d. denomerator

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13. Every sequence which has a limit is called ……..

a. divergence b. convergence c. covergence d. divergent

14. If the intersection of A and B is an empty set, A and B are called …….

a. complement b. joint c. disjoint d. complete

15. Every set which is congruent to the natural numbers N is called ……

a. countable b. incountable c. infinite d. definite

16. Which of the following is an adverb?

a. line b. linear c. linearly d. collinear

17. The opposite of the word "proper" is ……

a. inproper b. properless c. properly d. improper

18. Algebraic constructions are dealt with ……

a. operations b. addition c. multiplication d. substruction

19. Some people think that mathematics is the science of pattern and ……..

a. order b. number c. property d. line

20. Any theorem which is accepted without a proof is called ……

a. proposition b. axiom c. lemma d. corollary

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متن زیر را به فارسی روان ترجمه کنید.

Spirals

The chambered nautilus is a sea creature that moves into a series of successively larger compartments as it grows. Each compartment or chamber has the same shape except the last one, when the animal is fully grown. This photograph shows the shell of a chambered nautilus which has been cut in half to reveal these compartments. It has the shape of a mathematical curve called a *logarithmic spiral*.

A *spiral* is a curve traced by a point that moves around a fixed point from which it continually moves away.

There are several kinds of spirals. The logarithmic spiral was discovered by Descartes, the man who invented coordinate geometry. Archimedes wrote a book titled *On Spirals* in which he described another type of spiral which has since been named for him. The groove in a phonograph record is in the shape of an *Archimedean spiral*.

$f_1,\ldots,f_n$ are also linearly independent, so $n \leq m$ by Theorem 5.4.4(b) again.

As a result of Corollaries 5.4.3 and 5.4.5 we can now define the *dimension* of a finite-dimensional vector space V to be the number of vectors in any basis for V; we shall denote it by dim V (or by $\dim_F V$ if we want to emphasise the field of scalars of V).

Remark Strictly speaking, we have overlooked the case of $V = \{0\}$ throughout this section. This can be tidied up by defining dim $\{0\} = 0$ and adopting the convention that the empty set is a basis for $\{0\}$. However, $\{0\}$ is a particularly uninteresting vector space, and so we shall leave the details to be filled in by those intersted in doing so.

Examples 5.4.4

1. dim $R^n = n$; dim $P_n = n + 1$; dim $M_{2,2}(R) = 4$; $\dim_R C = 2$.
2. If $W = <(1,1,-2),(2,1,-3),(-1,0,1),(0,1,-1)>$ then dim $W = 2$, as we saw earlier that $(0,1,-1),(-1,0,1)$ is a basis for W.
3. Let W be any subspace of R^2. Then, if $W \neq \{0\}$, dim $W = 1$ or 2.
   (a) If dim $W = 1$, let e be a basis for W. Then $W = <e>$ which is represented by a line through the origin (example 5.2.2.1).
   (b) If dim $W = 2$, let e, f be a basis for W. Then $W = <e,f> = R^2$.

   Thus, The subspaces of R^2 are $\{0\}$, R^2 and lines through the origin.

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ساعت ۱۴

گزینه درست را انتخاب نمائید.

1.To compute a definite integral we may first compute the …… .

a. derivative b. anti- derivative c. differential d. difference

2. The adjective form of "to create" is …… .

a. creative b. created c. creatively d. creativity

3. The simplest regular polygon is the …… .

a. square b. pentagon c. hexagon d. equilateral triangle

4. The number of different …… Of n objects is n! .

a. orders b. summations c. arrangements d. computations

5. The operation of addition is defined …… .

a. inductively b. previously c. induction d. induced

6. Any …… for which we present no proof is called an axiom.

a. arithmetic b. statement c. lemma d. theorem

7. The points A, B, C and D are called collinear if they are on a/an ..... .

a. circle b. cure c. straight line d. square

8. The set of all right co-sets of a normal subgroup is a/an ..... of the given group.

a. partition b. relation c. qoutient group d. normalization

9. The well- ordering principle is the characteristic of the set of ..... Numbers.

a. real b. complex c. natural d. rational

10. The deficiency in the system of rational numbers is called ..... .

a. completion b. completed c. completenss d. conclusion

11. A permutation is called even if it can be decomposed as the set of even ..... .

a. permutation b. transposes c. arrangements d. numbers

12. In the number 10^3 the number 3 is called ..... .

a. exponent b. explicit c. exponetial d. exploit

13. we define the vector spaces over a/an ..... .

a. group b. ring c. field d. set

14. parts of numbers smaller than one in scientific usage are given as ..... .

a. digits b. fractions c. decimals d. intervals

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15.Ordinary people can ..... Mathenatics to every day problems.

a. apply　　b. applied　　c. application　　d. appliable

16. A/an ..... Is a table showing the moths, weeks and days of the year.

a. abacus　　b. calendar　　c. numerals　　d. scholars

17. If in the reation R, x R y implies that y R x. We call it ..... .

a. transitive　　b. symmetric　　c. reflexive　　d. equivalent

گزینه نادرست را انتخاب نمائید.

18. a) If A and B are countably infinite then $A \times B$ is countably infinite.

b) If A is finite with n elements and B is finite with m elements, then $A \times B$ is finite with mn elements.

c) The set Q of all rational numbers is countably infinite.

d) The set R of all read numbers is countably infinite.

19. a) In every group G any element has an inverse in G.

b) An abelian group is a group which is commutative.

c) Every vector space is finite dimensional.

d) A diagonal matrix $A=(a_{ij})$ is a square matrix in which $a_{ij}=0$ for $i \neq j$

20. a) statistics is used to explain correctly the numerical values.

b) statistics is a scienlific method of collecting and interpreting data.

c) statistics mostly deals with numerical values.

d) statislics deals with situation in which one is sure of what is going to happen.

سئوالات تشریحی

هر یک از جملات زیر را به فارسی روان ترجمه کنید.

1.Our senses can often fool us and our intuition may be completely wrong. The architects of ancient Greece understood the nature of illusions in geometric figures and prepared for them in their work.

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2.Thus, it should come as no surprise that the proofs of oarious properties of the arithmetic of natural numbers are based on Axiom P5.

3. It follows from the principle of mathematical induction that S(p) is true for every natural number P, that is p+m=p+n implies m=n for all m, n, p$\in N$.

4. We assume that A is a nonempty subset of N and that A has no first element and show that this leads to a contradiction. By the law of trichotomy $M \cap A=\varphi$

5. What kind of deficiency can exist in the system of all rational numbers? After all, the rational numbers satisfy those many properties which make them an ordered field.

6. Therefore A has no first element. Since A is a ray in R, it follows from Deddekind's theorem that A′ has a largest element M.

7. Do you know how large a miltion is? It is easy to write 1,000,000 but how big is that? A million days ago was in the 8 th century B.C.

8. Mathematics is a language. It is a language of quantity used to compare and calculate. It is a language of size and order and a language for exploring logical relation ships.

9.The main problem with Roman numerals was that they had no symbol for zero. This meant that as numbers grew larger, they had to add more symbols.

10. The set Q of all rational numbers has the interesting property of being a count ably infinite set which is dense in R.