

# B.A. ECONOMICS IV SEMESTER COMPLEMENTARY COURSE

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## *MATHEMATICS FOR ECONOMIC ANALYSIS*

### QUESTION BANK

1. The objects constituting a set are called  
(a) estimates (b) elements  
(c) set objects (d) none of these
2. Who is regarded as the founder of theory of sets?  
(a) Adam Smith (b) Karl Frederich Gauss  
(c) George Cantor (d) Euler
3. A collection of well-defined distinct objects thought of as a whole is called  
(a) union (b) derivative  
(c) set (d) integral
4. "No two elements of a set are identical". This statement is  
(a) Always true (b) sometimes true  
(c) not true (d) all of the above is possible
5. A set containing no element is called  
(a) null set (b) empty set  
(c) void set (d) all the above
6. A set containing only one element is termed as  
(a) unit set (b) singleton set  
(c) both (a) and (b) (d) none of these
7. A set of totality of elements from all possible sets is called  
(a) Union set (b) Intersection set  
(c) Universal set (d) Unit set
8. If two sets contain the same distinct elements, then they are called  
(a) equal sets (b) unequal sets  
(c) equivalent sets (d) all the above
9. If two sets contain same number of distinct elements but not the same elements are called  
(a) equal sets (b) unequal sets  
(c) equivalent sets (d) all the above
10. Sets and set operations can be represented by drawing diagrams termed as  
(a) Pie diagrams (b) Venn diagrams

(c) Histogram (d) Ogives

11. If every element of a set B is also an element of A, then

(a) A is a subset of B (b) B is a subset of A

(c) A is not a subset of B (d) B is not a subset of A

12. In Venn diagram, the universal set is represented by

(a) points within a rectangle (b) points within a circle

(c) Both (a) and (b) (d) none of these

13. "Null set is a proper subset of all the non-null sets". This statement is

(a) always true (b) sometimes true

(c) never true (d) true subject to some conditions

14. The set which contains all the elements of the two given sets A and B, avoiding duplication, is called

(a) intersection of A and B (b) union of A and B

(c) set of A and B (d) none of these

15. Union of A with A, that is,  $A \cup A =$

(a) complement of A (b) A itself

(c) cannot be determined (d) none of these

16. Union of A and the universal set is

(a) A (b) A'

(c) universal set (d) none of these

17. Union of A and a null set is equal to

(a) intersection of A and null set (b) null set

(c) both (a) and (b) (d) A

18. Union of A with B is same as union of B with A, that is,  $A \cup B = B \cup A$  is termed as

(a) associative law of union (b) cumulative law of union

(c) reflective law (d) all the above

19. The associative law of union is

(a)  $A \cup (B \cup C) = (A \cup B) \cup C = A \cup B \cup C$  (b)  $A \cup B = B \cup A$

(c)  $A \cup B = A \cup C$  (d)  $B \cup C = B \cup A$

20. If B is a subset of A, then  $A \cup B =$

(a) B (b) A

(c) intersection of A and B (d) none of these

21. If a set C contain all the elements which are present in both the sets A and B, then set C is called

(a) Union of A and B (b) Intersection of A and B

(c) Complement of A (d) Complement of B

22. If two sets do not have any common element, then they are called

(a) complement sets (b) joint sets

(c) disjoint sets (d) none of these

23. A set containing all the elements of the universal set except those of set A is called

(a) complement of set A (b) complement of universal set

(c) union of A and universal set (d) universal set itself

24. The set of all elements belonging to A but not to B is

(a)  $B - A$  (b)  $A - B$

(c)  $A'$  (d)  $B'$

25. The set of all subsets of a set A is called

(a) power set of A (b) complement of A

(c) Both (a) and (b) (d) none of these

26. Any number raised to the power zero is always equal to

(a) zero (b) one

(c) two (d) that number itself

27. If  $a^n = n$ , then  $a =$

(a) (b)

(c) (d)  $n$

28. The value of  $\frac{1}{x} \times \frac{1}{y}$  is

(a)  $1/x$  (b)  $1/y$

(c) (d) 1

29. The value of  $2^3 \times 7^3$  is

(a)  $32 \times 7$  (b)  $32 \times 7^3$

(c)  $2 \times 7$  (d) none of these

30. The value of x that satisfies the equation  $\frac{4}{5}x = 4$  is

(a)  $4/5$  (b) 4

(c)  $5/4$  (d) 5

31. Solving the equation  $x + 4 = 9$  gives the value of x as

(a) 4 (b) 5

(c) 6 (d) 7

32. Unknown values in an equation are called

(a) constants (d) numeraire

(c) variables (d) all the above

33. Given or known values in an equations are called

(a) constants (d) parameters

(c) coefficients (d) all the above

34. In any equation (or function) involving two variables, such as  $y = 2x + 1$ , the variable that appears

on the right-hand side of the equation is by convention called

(a) dependent variable (b) independent variable

(c) endogenous variable (d) explained variable

35. A variable which is free to take any value we choose to assign to it is called  
 (a) dependent variable (b) independent variable  
 (c) endogenous variable (d) explained variable
36. The variable that stands alone on the left-hand side of the equation such as  $y = 2x + 1$  is known as  
 (a) dependent variable (b) independent variable  
 (c) endogenous variable (d) explained variable
37. The functions  $y = 2x + 1$  and  $x = \frac{1}{2}y - \frac{1}{2}$  are said to be  
 (a) non-linear functions (b) inverse functions  
 (c) step functions (d) all the above
38. A function where a variable  $x$  can only vary in jumps, is often called  
 (a) non-linear functions (b) inverse functions  
 (c) step functions (d) all the above
39. The increase in dependent variable that results when the independent variable increases by one unit in a simple linear function is called
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- (a) y-intercept of the curve (b) slope of the curve  
 (c) x-intercept of the curve (d) marginal value
40. The value of the dependent variable where the graph cuts the y-axis is called  
 (a) x-intercept (b) y-intercept  
 (c) slope (d) none of these
41. The point at which the graph cuts the x-axis is called  
 (a) x-intercept (b) y-intercept  
 (c) slope (d) none of these
42. A linear function of the form  $6x - 2y + 8 = 0$  is known as  
 (a) explicit function (b) implicit function  
 (c) quadratic function (d) all the above
43. If we are told that the two statements ' $y = 3x$ ' and ' $y = x + 10$ ' are both true at the same time, they are called  
 (a) implicit functions (b) explicit functions  
 (c) simultaneous equations (d) quadratic equations
44. Solving the simultaneous equations  $8x + 4y = 12$  and  $-2x + y = 9$  gives  
 (a)  $x = -\frac{3}{2}$  and  $y = 6$  (b)  $x = 4$  and  $y = 2$   
 (c)  $x = \frac{1}{2}$  and  $y = \frac{1}{2}$  (d) none of these
45. Given the demand and supply functions  $q_D = -8p + 2000$  and  $q_S = 12p - 200$  respectively, the equilibrium price is

(a)  $p = 100$  (b)  $p = 110$

(c)  $p = 120$  (d)  $p = 140$

46. The inverse demand function of the demand function  $q_D = -8p + 2000$  is

(a)  $p = -1/8 q_D + 250$  (b)  $-8 q_D + 250$

(c)  $p = 2000 - 8p$  (d) none of these

47. Given the demand function  $q_D = -8p + 2000$  and its inverse  $p = -1/8 q_D + 250$ ,  $p$  in the inverse

function which is interpreted as the maximum price that buyers are willing to pay for the

(a) supply price (b) demand price

(c) equilibrium price (d) reserved price

48. Given the supply function  $q_S = 12p - 200$  and its inverse function  $p = 1/12 q_S + 50/3$ ,  $p$  in the

inverse function which is interpreted as the minimum price that sellers are willing to accept for

the quantity  $q_S$  is called

(a) supply price (b) demand price

(c) equilibrium price (d) reserved price

49. The equilibrium price and quantity, given the inverse demand and supply functions

$p_D = -3q + 30$  and  $p_S = 2q - 5$

(a)  $p = 9$  and  $q = 7$  (b)  $p = 10$  and  $q = 7$

(c)  $p = 9$  and  $q = 8$  (d)  $p = 7$  and  $q = 9$

50.  $ax^2 + bx + c = 0$  is

(a) linear equation (b) quadratic equation

(c) polynomial of degree five (d) none of these

51. Given any quadratic equation  $ax^2 + bx + c = 0$ , where  $a$ ,  $b$ , and  $c$  are given constants, the solutions

(roots) are given by the formula

(a)  $x =$  (b)  $x =$

(c)  $x =$  (d) none of these

52. The simplest case of a quadratic function is

(a)  $y = x^2$  (b)  $y = x^3$

(c)  $y = x^2 + b$  (d)  $y = x^2 + bx + c$

53. A polynomial equation with degree two is called

(a) linear equation (b) quadratic equation

(c) parabola equation (d) all the above

54. The simplest form of rectangular hyperbola is

(a)  $y = 1/x$  (b)  $y = x^2$

(c)  $y = x - 2$  (d)  $y = x^3$

55. A possible use in economics for the circle or the ellipse is to model  
 (a) production possibility curve (b) demand curve  
 (c) isocost line (d) supply curve
56. A consumer's income or budget is 120. She buys two goods, x and y, with prices 3 and 4 respectively. Then the budget constraint can be expressed as  
 (a)  $4x + 3y = 120$  (b)  $3x + 4y = 120$   
 (c)  $12x + 12y = 120$  (d) cannot be determined
57. If a consumer's budget constraint is given as  $P_x X + P_y Y = B$ , then the absolute slope of the budget line is  
 (a) B (b)  $X/Y$   
 (c)  $P_x/P_y$  (d) none of these
58. A determinant composed of all the first-order partial derivatives of a system of equations, arranged in ordered sequence is called  
 (a) Hessian determinant (b) Jacobian determinant  
 (c) discriminant (d) first order determinant
59. If the value of the Jacobian determinant = 0, the equations are  
 (a) functionally dependent (b) functionally independent  
 (c) linearly independent (d) none of these
60. If the value of the Jacobian determinant, the equations are  
 (a) functionally dependent (b) functionally independent  
 (c) linearly dependent (d) none of these
61. A Jacobian determinant is used to test  
 (a) linear functional dependence between equations  
 (b) non-linear functional dependence between equations  
 (c) both linear and non-linear functional dependence between equations  
 (d) none of these
62. A determinant composed of all the second-order partial derivatives, with the second-order direct partials on the principal diagonal and the second-order cross partials off the principal diagonal, and which is used to second order condition of optimization is called  
 (a) Jacobian determinant (b) Hessian determinant  
 (c) discriminant (d) none of these
63. A positive definite Hessian fulfills the second-order conditions for  
 (a) maximum (b) minimum  
 (c) both maximum and minimum (d) minimax
64. A negative definite Hessian fulfills the second order conditions for

- (a) maximum (b) minimum  
(c) both maximum and minimum (d) minimax
65. The determinant of a quadratic form is called  
(a) Jacobian determinant (b) Hessian determinant  
(c) discriminant (d) none of these
66. A mathematical statement setting two algebraic expressions equal to each other is called  
(a) equation (b) hypothesis  
(c) inequality (d) all the above
67. An equation in which all variables are raised to the first power is known as  
(a) linear equation (b) non-linear equation  
(c) quadratic equation (d) polynomial of degree two
68. The slope of a horizontal line is  
(a) one (b) zero  
(c) two (d) three
69. The slope of a vertical line is  
(a) one (b) zero  
(c) two (d) undefined
70. An iso-cost line represents  
(a) different combinations of two inputs that can be purchased with a given sum of money  
(b) different combinations of two goods that can be purchased with a given income  
(c) both (a) and (b)  
(d) none of these
71.  $(A+B)+C = A+(B+C)$ . This law of matrices is known as  
(a) Cumulative law  
(b) Associative law  
(c) Distributive law  
(d) Identity law
72.  $(A+B) = (B+A)$ . this law of matrices is known as  
(a) Cumulative law  
(b) Associative law  
(c) Distributive law  
(d) Identity law
73.  $k(A+B) = kA + kB$ . This law of matrices is known as  
(a) Cumulative law  
(b) Associative law  
(c) Distributive law  
(d) Identity law

74. If in a matrix, the number of rows is the same as the number of columns, it is called

- (a) Singular matrix
- (b) Non-singular matrix
- (c) Square matrix
- (d) Column vector

75. In a matrix, if there is only one row but any number of columns, it is called

- (a) Row matrix
- (b) Column matrix
- (c) Row vector
- (d) Both a & c

76. If all the elements of a matrix of any order are zero, it is called

- (a) Identity matrix
- (b) Null matrix
- (c) Zero matrix
- (d) Both b & c

77. A square matrix with 1's in its principal diagonal and zeros everywhere else is

- (a) Diagonal matrix
- (b) Identity matrix
- (c) Leading diagonal
- (d) Scalar matrix

78. If the columns of a given matrix A and B are changed into rows and vice-versa, the matrix thus

obtained is called the

- (a) Symmetric matrix
- (b) Transpose of a matrix
- (c) Singular matrix
- (d) Rank of a matrix

79. A square matrix A, such that  $A = A'$ , is called a

- (a) Symmetric matrix
- (b) Skew-symmetric matrix
- (c) Singular matrix
- (d) Rank of a matrix

80. If the determinant formed by the elements of the matrix A is equal to zero, then the matrix is

- (a) Skew symmetric
- (b) Symmetric
- (c) Singular
- (d) Non-singular



81. If the determinant formed by the elements of the matrix is not equal to zero, then the matrix is called

- (a) Skew symmetric
- (b) Symmetric
- (c) Singular
- (d) Non-singular

82. The matrix  $A$  multiplied by its inverse will be a

- (a) Identity matrix
- (b) Skew-symmetric matrix
- (c) Idempotent matrix
- (d) Adjoint of a matrix

83. A inverse is defined only if  $A$  is a

- (a) Square matrix
- (b) Column Vector
- (c) Orthogonal matrix
- (d) Skew-symmetric matrix

84. the sufficient condition required for the matrix to possess inverse is that the matrix should be

- (a) Square matrix
- (b) Singular matrix
- (c) Non-singular matrix
- (d) Orthogonal matrix

85. which method is used for finding inverse of a matrix

- (a) Gauss elimination method
- (b) Henrich Standard method
- (c) Co-factor method
- (d) Both a & c

86. A matrix with all elements zero other than all the diagonals is called

- (a) Diagonal matrix
- (b) Orthogonal matrix
- (c) Unit matrix
- (d) Column vector

87. Find the co-factor  $A_{23}$  of the matrix  $A =$

- (a) 23
- (b) 7
- (c) -23
- (d) -7

88. Find the determinant of the matrix  $A =$

- (a) 340

- (b) 100
- (c) 364
- (d) 76

89. A square matrix  $A$  of order 'n' is called a diagonal matrix if its non-diagonal elements are

- (a) Zero
- (b) Non-zero
- (c) One
- (d) None of the above

90. A diagonal matrix whose diagonal elements are equal is called

- (a) Unit matrix
- (b) Singular matrix
- (c) Scalar matrix
- (d) Non-singular matrix

91. A square matrix  $A$  of order  $m \times n$  is called an upper triangular matrix if  $a_{ij} = 0$  for all

- (a)  $i > j$
- (b)  $i < j$
- (c)  $i = j$
- (d) all of the above

92. If  $A$  &  $B$  are symmetric matrices, then  $A + B$  is

- (a) Symmetric
- (b) Non-symmetric
- (c) Skew symmetric
- (d) Non-skew symmetric

93. For any square matrix  $A$  of order 'n',  $A + A^T$  is

- (a) Skew symmetric
- (b) Non-skew symmetric
- (c) Symmetric
- (d) Non-symmetric

94. For any square matrix  $A$  of order 'n',  $A - A^T$  is

- (a) Skew symmetric
- (b) Non-skew symmetric
- (c) Symmetric
- (d) Non-symmetric

95. If matrix  $A$  is a matrix of order  $n \times m$  and  $B$  is another matrix of order  $m \times n$ , then  $BA$  will be the matrix of order

- (a)  $n \times m$
- (b)  $m \times n$

(c)  $n \times n$

(d)  $m \times m$

96. If matrix  $A$  is comfortable for multiplication the  $(AB)^T$  is equal to

(a)  $(BA)^T$

(b)  $BTAT$

(c)  $ATBT$

(d)  $AT+BT$

97. If  $A$  is a square matrix of order 'n' and  $I$  is the unit matrix of the same order, then  $AI$  is equal to

(a)  $A$

(b)  $IA$

(c)  $I$

(d) Both (a) & (b)

98. If the  $i$ th row and  $j$ th column of a square matrix of order 'n' are deleted, the determinant of the

resulting square sub-matrix is called

(a) Adjoint

(b) Co-factor

(c) Minor

(d) Rank

99. The signed minor of the matrix  $A$  is called

(a) Adjoint

(b) Co-factor

(c) Minor

(d) Rank

100. The determinant of a matrix and that of its transpose are

(a) Equal

(b) Zero

(c) One

(d) Negatively related

101. If two rows or columns of a determinant  $A$  are identical, then the value of the determinant is

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(a) Equal

(b) Zero

(c) One

(d) Negatively related

102. If every element of a row or column of a square matrix  $A$  is zero, then the value of the

determinant is

- (a) Equal
- (b) One
- (c) Zero
- (d) Not equal

103. If each element of a row or column is a sum of two elements, the determinant can be expressed as the

- (a) sum of two determinants
- (b) difference of two determinants
- (c) multiplication of two determinants
- (d) division of two determinants

104. A square matrix A such that  $A^2 = A$  is called

- (a) Orthogonal matrix
- (b) Skew symmetric matrix
- (c) Idempotent matrix
- (d) Singular matrix

105. If A & B are symmetric matrix, then  $AB - BA$  is

- (a) Symmetric
- (b) Skew symmetric matrix
- (c) Idempotent matrix
- (d) Orthogonal matrix

106. The transpose of the cofactor matrix is called

- (a) Adjoint of the matrix
- (b) Power of a matrix
- (c) Minor of the matrix
- (d) Rank of a matrix

107. For any square matrix A of order 'n',  $A(\text{Adj } A)$  is equal to

- (a)  $(\text{Adj } A)A$
- (b) Determinant A
- (c) Rank of A
- (d) Both a & b

108. If  $A \cap B = \emptyset$ , then A and B are called

- (a) Disjoint set
- (b) Complement set
- (c) Unit set
- (d) empty set

109. Matrix multiplication does not satisfy ----- law

- (a) Associative
- (b) Distributive

- (c) Commutative
  - (d) None of the above
110.  $Y = a_0 + a_1X$  is a function
- (a) Nonlinear
  - (b) Proportional
  - (c) polynomial
  - (d) linear
111. Relation between two numbers or variables are called
- (a) Function
  - (b) Binary relation
  - (c) Inverse relation
  - (d) None of the above
112. If B is a subset of A , then A is a ----- of B
- (a) Super set
  - (b) Sub set
  - (c) Empty set
  - (d) Universal set
113. the elements in the horizontal line in a matrix is called
- (a) columns
  - (b) rows
  - (c) elements
  - (d) diagonal
114. If matrix A is of  $m \times n$  dimension, then  $A^t$  will be ----- dimension
- (a)  $n \times m$
  - (b)  $m \times n$
  - (c)  $n \times p$
  - (d)  $m \times m$
115. If  $A = A^t$  , then A is
- (a) Symmetric matrix
  - (b) Skew symmetric matrix
  - (c) Identity matrix
  - (d) Orthogonal matrix
116. Given  $S_1 = \{a, b, c\}$   $S_2 = \{a, 1, 2\}$ , then  $(S_1 - S_2) \cap (S_2 - S_1)$  is
- (a) 1
  - (b) a
  - (c) b
  - (d) null set
117. The set of “stars in the sky” is an example of
- (a) Countable set
  - (b) Infinite set

(c) Finite set

(d) Unit set

118. Ordered pairs of two sets are called

(a) Elements

(b) function

(c) Cartesian product

(d) None of the above

119. If  $|A|=0$ , then matrix A is called

(a) Singular

(b) Nonsingular

(c) Identical

(d) Proportional

120.  $AB=BA=I$ , then B is said to be ----- matrix of A

(a) Adjoint

(b) Inverse

(c) Determinant

(d) cofactor

121. Determinant of triangular matrix is the product of

(a) Diagonal elements

(b) Off-diagonal elements

(c) Rows

(d) columns

122. If  $|A|=24$ , then the determinant of its transpose is

(a) 48

(b) 0

(c) 24

(d) 42

123.  $AA^{-1} = \text{-----} = A^{-1}A$

(a) I

(b) A

(c)  $A^2$

(d) 0

124. If the number of elements of the two sets are equal, then they are called

(a) Equal set

(b) Equivalent set

(c) Order set

(d) Subset

125. If a set has three elements, then its power set consist of ----- elements

(a) 3

(b) 5

(c) 6

(d) 8

126. The set of all elements which belong to set B but do not belong to set A is

(a)  $A \cup B$

(b)  $A - B$

(c)  $B - A$

(d)  $A \cap B$

127. Given A is  $2 \times 2$  and B is  $2 \times 4$ , then the matrix AB will be of the order

(a)  $2 \times 2$

(b)  $2 \times 4$

(c)  $4 \times 2$

(d)  $1 \times 2$

128. If the matrix  $C^2 = C$ , the matrix C is

(a) Square matrix

(b) Triangular matrix

(c) Idempotent matrix

(d) Identity matrix

129. Maximum number of linearly independent rows and columns of a matrix is called

(a) Rank

(b) Adjoint

(c) Determinant

(d) Inverse

130. Determinant of a  $3 \times 3$  square matrix is called ----- determinant

(a) First order

(b) Second order

(c) Third order

(d) Fourth order

131. The set consisting of all the elements which belong to A as well as B is called

(a) Union

(b) Intersection

(c) Complement

(d) Partition

132. The total number of elements of the set of all possible outcome when two coins are tossed

(a) 2

(b) 3

(c) 4

(d) 6

133. If the relation is defined as from A to B, then relation from B to A

- (a) Relation
- (b) Inverse relation
- (c) Function
- (d) Binary

134. Special type of relation is

- (a) Function
- (b) Binary relation
- (c) Inverse
- (d) None of the above

135. Rectangular array of numbers, variables or parameters is called

- (a) Set
- (b) Exponents
- (c) Matrix
- (d) Function

136. When the demand for a good is given by  $Q=50-P$ , the maximum amount that would be demanded at nil price

- (a) 1
- (b) 0
- (c) 40
- (d) 50

137. When  $A = \{0\}$ , the set A is

- (a) Null
- (b) Equal
- (c) Singleton
- (d) All of the above

138. Given  $A=\{a,b,c\}$  and  $B=\{a,d,c\}$ , then  $A \cup B$  will be

- (a) a,b,c
- (b) a,d,c
- (c) c,d,a
- (d) a,b,c,d

139. in a square matrix, the elements lie from left top to right bottom is

- (a) diagonal elements
- (b) row elements
- (c) column elements
- (d) triangular elements

140. if all the elements below the leading diagonal are zero in a square matrix, it is

- (a) lower triangular matrix
- (b) identity matrix
- (c) inverse matrix



(d) upper triangular matrix

141. conformity condition for matrix addition is that matrices should be

(a) square

(b) same order

(c) equal

(d) proportional

142. commutative law of matrix subtraction is

(a)  $A+B=B+A$

(b)  $A-B=B-A$

(c)  $A-B=-B+A$

(d)  $A+B=A-B$

143. In matrix algebra  $(AB)C=A(BC)$  is

(a) Associative

(b) Commutative

(c) Distributive

(d) None of the above

144. In matrix expression of linear equation,  $AX=B$ ,  $X$  denotes

(a) Coefficient matrix

(b) Constants

(c) Identity matrix

(d) Solution vector

145. If in a matrix any two rows or columns are identical or proportional or linearly dependent, the determinant will be

(a) Equal

(b) Zero

(c) Unity

(d) Infinity

146. Given the demand curve,  $P=20-0.2Q$ , the revenue curve will be

(a)  $20-0.2Q$

(b)  $10-.1Q$

(c)  $20Q-0.2Q$

(d)  $20Q-0.2Q^2$

147. If the demand curve is linear and negatively sloped, the marginal revenue curve has a slope

(a) Negative

(b) Positive

(c) Infinite

(d) None of the above

148. The slope of isocost line is the ratio of

- (a) Quantities
  - (b) Input prices
  - (c) Costs
  - (d) Product prices
149. The line of linear equation should begin from
- (a) The origin
  - (b) X axis
  - (c) Y axis
  - (d) Any of the above
150. For a matrix minor of element  $M_{33} = 25$ , the cofactor is
- (a) -25
  - (b) 25
  - (c) 0
  - (d) 33

## ANSWER KEY

1. (b) elements
2. (c) George Cantor
3. (c) set
4. (a) always true
5. (d) all the above
6. (c) both (a) and (b)
7. (c) universal set
8. (a) equal sets
9. (c) equivalent sets
10. (b) Venn diagrams
11. (b) B is a subset of A
12. (a) points within a rectangle
13. (a) always true
14. (b) union of A and B
15. (b) A
16. (c) universal set
17. (d) A
18. (b) cumulative law of union
19. (a)  $A \cup (B \cup C) = (A \cup B) \cup C = A \cup B \cup C$
20. (b) A
21. (b) intersection of A and B
22. (c) disjoint sets
23. (a) complement of set A
24. (b)  $A - B$
25. (a) power set of A
26. (b) one
27. (a)
28. (c)

29. (b)  $32 \times 7$
30. (a)  $4/5$
31. (b) 5
32. (c) variable
33. (d) all the above
34. (b) independent variable
35. (b) independent variable
36. (a) dependent variable
37. (b) inverse functions
38. (c) step function
39. (b) slope of the curve
40. (b) y-intercept of the graph
41. (a) x-intercept
42. (b) implicit function
43. (c) simultaneous equations
44. (a)  $x = -3/2$  and  $y = 6$
45. (b)  $P = 110$
46. (a)  $p = -1/8 q_D + 250$
47. (b) demand price
48. (a) supply price
49. (a)  $P = 9$  and  $q = 7$
50. (b) quadratic equation
51. (a)  $x =$
52. (a)  $y = x^2$
53. (b) quadratic equation
54. (a)  $y = 1/x$
55. (a) production possibility curve
56. (b)  $3x + 4y = 120$
57. (c)  $P_x/P_y$
58. (b) Jacobian determinant
59. (a) functionally dependent
60. (b) functionally independent
61. (c) Both linear and non-linear functional dependence between equations
62. (b) Hessian determinant
63. (b) minimum
64. (a) maximum
65. (c) discriminant
66. (a) equation
67. (a) linear equation
68. (b) zero
69. (d) undefined
70. (a) different combinations of two inputs that can be purchased with a given sum of money
71. (b) Associative law
72. (a) Cumulative law
73. (c) Distributive law
74. (c) Square matrix
75. (d) Both a & c
76. (d) Both b & c

- 77. (b) Identity matrix
- 78. (b) Transpose of a matrix
- 79. (a) Symmetric matrix
- 80. (c) Singular
- 81. (d) Non-singular
- 82. (a) Identity matrix
- 83. (a) Square matrix
- 84. (c) Non-singular matrix
- 85. (d) Both a & c
- 86. (a) Diagonal matrix
- 87. (d) 7
- 88. (c) 364
- 89. (b) Non-zero
- 90. (c) Scalar matrix
- 91. (a)  $i > j$
- 92. (a) Symmetric
- 93. (c) Symmetric
- 94. (a) Skew symmetric
- 95. (d) maximum
- 96. (b)  $B^T A^T$
- 97. (d) Both a & b
- 98. (c) Minor
- 99. (b) Co-factor
- 100. (a) Equal
- 101. (b) Zero
- 102. (c) Zero
- 103. (a) sum of two determinants
- 104. (c) Idempotent matrix
- 105. (b) Skew symmetric matrix
- 106. (a) adjoint of a matrix
- 107. (d) both a & b
- 108. (a) Disjoint set
- 109. (c) Commutative
- 110. (d) linear
- 111. (b) Binary relation
- 112. (a) Super set
- 113. (b) rows
- 114. (a)  $n \times m$
- 115. (a) Symmetrical set
- 116. (d) Null set
- 117. (b) infinite set
- 118. (c) Cartesian product
- 119. (a) Singular
- 120. (b) Inverse
- 121. (a) Diagonal elements
- 122. (c) 24
- 123. (a) I
- 124. (b) Equivalent set
- 125. (d) 8
- 126. (c)  $B - A$
- 127. (b)  $2 \times 4$

- 128. (d) Identity matrix
- 129. (a) Rank
- 130. (c) Third order
- 131. (b) Intersection
- 132. (c) 4
- 133. (b) Inverse relation
- 134. (a) Function
- 135. (c) Matrix
- 136. (d) 50
- 137. (c) Singleton
- 138. (d) a, b, c, d
- 139. (a) Diagonal elements
- 140. (b) Identity Matrix
- 141. (b) Same order
- 142. (c)  $A - B = -B + A$
- 143. (a) Associative
- 144. (d) Solution Vector
- 145. (b) Zero
- 146. (d)  $20Q - 0.2Q^2$
- 147. (a) Negative
- 148. (b) Input prices
- 149. (d) Any of the above
- 150. (b) 25\_\_