MCQ's

1. Information in science, business and mathematics is often organized into rows and columns to form rectangular arrays called:
   a) Matrices
   b) Determinant
   c) System of Linear Equations
   d) None of the above

Answer: (a)

2. If a matrix is in reduced row echelon form, then it is also in row echelon form:
   a) False
   b) True
   c) May be
   d) None of the above

Answer: (b)

3. A system of linear equations is said to b homogeneous if the constant terms are all:
   a) One
   b) Zero
   c) Both (a) and (b)
   d) None of the above

Answer: (b)

4. A homogeneous linear system always has the trivial solution, there are only two possibilities for its solutions:
   a) The system has only the trivial solution.
   b) The system has infinitely many solutions in addition to the trivial solution.
   c) Both (a) and (b)
   d) None of the above

Answer: (c)

5. A matrix with only one column is called:
   a) A Null matrix.
   b) A row matrix.
   c) Homogeneous matrix.
   d) None of the above

Answer: (d)

6. A set of linear equations is represented by the matrix equation Ax=b. The necessary condition for the existence of a solution for this system is:
    a) A must be invertible.
    b) b must be linearly depended on the columns of A.
    c) b must be linearly independent of the columns of A.
    d) None of the above

Answer: (b)

7. Indication of number of rows and number of columns in a matrix is classified as:
    a) Direction.
    b) Classification.
    c) Specification.
    d) None of the above

Answer: (d)

8. Value of determinant is computed by adding multiples of one row to:
    a) Another dimension.
    b) Another row.
    c) Another column.
    d) None of the above

Answer: (b)

9. In square matrix, all elements other than elements along primary diagonal are:
    a) Equal to zero.
    b) Equal to two.
    c) Equal to one.
    d) None of the above

Answer: (a)

10. According to determinant properties, multiple of one row is added to another row then determinant:
    a) Changed.
    b) Unchanged.
    c) Multiplied.
    d) None of the above

Answer: (b)

11. Method in which rows and columns are cross off and minor determinants are involved is classified as:
    a) Method of three factors.
    b) Method of one factor.
    c) Method of cofactors.
    d) None of the above

Answer: (c)

12. In Gaussian reduction procedure, row operations are performed to transform matrix A into:

- **a)** (m x m) identity matrix.
- **b)** (n x n) identity matrix.
- **c)** (f x p) identity matrix.
- **d)** None of the above

Answer: (a)

13. Matrix having same number of columns and rows is classified as:

- **a)** Triangle matrix.
- **b)** Rectangle matrix.
- **c)** Circle matrix.
- **d)** None of the above

Answer: (d)

14. Dimension of matrix with 6 columns and 4 rows is:

- **a)** 6x4.
- **b)** 6+4.
- **c)** 4x6.
- **d)** None of the above

Answer: (c)

15. Result of inverse will be one only when quantity b is multiplied by:

- **a)** Reciprocal b/2.
- **b)** Reciprocal 2/b.
- **c)** Reciprocal 1/b.
- **d)** None of the above

Answer: (c)

16. In adjacency matrix, each node has one row and:

- **a)** One column.
- **b)** Two columns.
- **c)** Three columns.
- **d)** None of the above

Answer: (a)

17. In Gaussian reduction procedure, matrix A is augmented with an identity (m x m) as:

- **a)** (A | N)
- **b)** (A | I)
- **c)** (A | B)
- **d)** None of the above

Answer: (b)

18. Method in which matrix rows are selected and multiply corresponding cofactors to yield determinant is called:

- **a)** Three factor expansion.
- **b)** One factor expansion.
- **c)** Cofactor expansion.
- **d)** None of the above

Answer: (c)

19. In computation of determinant of a matrix, significant efficiencies are introduced by combining row to another which:

- **a)** Contains subtraction.
- **b)** Contains zero.
- **c)** Contains addition.
- **d)** None of the above

Answer: (b)

20. After performing row operations on augmented matrix A in Gaussian reduction procedure then resulting matrix is:

- **a)** $(B^{-1} | I)$
- **b)** $(I | A^{-1})$
- **c)** $(M | B^{-1})$
- **d)** None of the above

Answer: (b)

21. Two equations that can be drawn as same line on graph then these equations are considered as:

- **a)** Constant equations
- **b)** Solved equations
- **c)** Non-Equivalent equations
- **d)** Equivalent equations

Answer: (d)

22. Number of ordered pair values (x, y) to satisfy linear equation ax + by =c are:

- **a)** Finite
- **b)** Infinite
- **c)** Zero
- **d)** None of the above

Answer: (a)

23. Set which consists of more than one equation is classified as:

- **a)** System of variables.
- **b)** System of equations.
- **c)** System of constants.
- **d)** None of the above.

Answer: (b)

24. In linear equations, finite set and infinite set are classified as its:

- **a)** Dimension set.
- **b)** Constant set.
- **c)** Solution set.
- **d)** None of the above.

Answer: (c)

25. Method in which both sides of equation are multiplied by nonzero constant is classified as:

- **a)** Gaussian elimination method.
- **b)** Gaussian inconsistent procedure.
- **c)** Gaussian consistent procedure.
- **d)** None of the above.

Answer: (a)

26. In Gaussian elimination method, original equations are transformed by using:

- **a)** Column operations.
- **b)** Mathematical operations.
- **c)** Row operations
- **d)** None of the above.

Answer: (c)

27. Transpose of a rectangular matrix is a:

- **a)** Rectangular matrix.
- **b)** Diagonal matrix.
- **c)** Square matrix.
- **d)** Scalar matrix.

Answer: (a)

28. Two matrices A and B are multiplied to get AB if:

- **a)** Both are rectangular.
- **b)** Both have same order.
- **c)** No. of rows of A is equal to no. of columns of B.
- **d)** None of the above.

Answer: (d)

29. If $|A|=0$, then A is:

- **a)** Zero matrix.
- **b)** Singular matrix.
- **c)** Non-singular matrix.
- **d)** None of the above.

Answer: (b)

30. If A is a symmetric matrix, then A^T =

- **a)** A.
- **b)** |A|.
- **c)** Diagonal matrix.
- **d)** None of the above.

Answer: (a)

31. In a matrix multiplication for A and B, $(AB)^T$ =

- **a)** $A\ B^T$
- **b)** $B^T\ A^T$.
- **c)** 1/AB
- **d)** None of the above.

Answer: (b)

32. For a non-trivial solution |A| is:

- **a)** $|A| > 0$
- **b)** $|A| < 0$
- **c)** $|A| = 0$
- **d)** None of the above.

Answer: (c)

33. For any non-singular matrix A, A^{-1} =

- **a)** Adj A/ |A|
- **b)** 1/ Adj A/ |A|
- **c)** |A| adj A
- **d)** None of the above.

Answer: (a)

34. A matrix having m rows and n columns with $m \neq n$ is said to be a

- **a)** Square matrix.
- **b)** Identity matrix.
- **c)** Rectangular matrix.
- **d)** None of the above.

Answer: (c)

35. [a b c] is a:

- **a)** Zero matrix.
- **b)** Diagonal matrix.
- **c)** Column matrix.
- **d)** Row matrix.

Answer: (d)

36. Two matrices A and B are added if:

- **a)** Both are rectangular.
- **b)** Both have same order.
- **c)** No. of columns of A is equal to columns of B.
- **d)** No. of rows of A is equal to no. of columns of B.

Answer: (b)

37. If AB exists, then $(AB)^{-1}$ is:

- **a)** AB.
- **b)** $B^{-1}A$
- **c)** $B^{-1}A^{-1}$
- **d)** None of the above

Answer: (c)

38. If A is a skew symmetric matrix, then A^T is:

- **a)** -A
- **b)** A
- **c)** 0
- **d)** None of the above

Answer: (a)

39. Equations having a common solution are called:

- **a)** Linear equations.
- **b)** Homogeneous equations.
- **c)** Simultaneous equations
- **d)** None of the above

Answer: (c)

40. If A and B are square matrices of sizes n x n, then which of the following statement is not true?

- **a)** det (AB) = det (A) det (B)
- **b)** det (A+B) = det (A) + det (B)
- **c)** det (kA) = k^n det (A)
- **d)** None of the above

Answer: (b)

41. Eigenvalues of a square matrix are always:

- **a)** Positive.
- **b)** Real and imaginary.
- **c)** Negative.
- **d)** Real.

Answer: (d)

42. If A and B are non-zero square matrices, then AB=0 implies:

- **a)** A and B are orthogonal.
- **b)** A and B are singular.
- **c)** A is singular.
- **d)** None of the above

Answer: (a)

43. If A and B be real symmetric matrices of size n x n, then:

- **a)** $AA^T=1$
- **b)** $A=A^{-1}$.
- **c)** AB = BA
- **d)** $(AB)^T = BA$

Answer: (d)

44. Rank of the matrix $\begin{bmatrix} 0 & 0 & -3 \\ 9 & 3 & 5 \\ 3 & 1 & 1 \end{bmatrix}$

- **a)** 0
- **b)** 1
- **c)** 2
- **d)** None of the above

Answer: (c)

45. Eigenvector(s) of the matrix $\begin{bmatrix} 0 & 0 & a \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is (are):

- **a)** (0, 0, a)
- **b)** (0, a, 0)
- **c)** (0, 0, 1)
- **d)** None of the above

Answer: (b)

46. Determinant of the matrix $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 100 & 1 & 0 & 0 \\ 100 & 200 & 1 & 0 \\ 100 & 200 & 300 & 1 \end{bmatrix}$ is:

- **a)** 1
- **b)** 100
- **c)** 200
- **d)** None of the above

Answer: (a)

47. The rank of a null matrix is:

- **a)** 1
- **b)** 2
- **c)** 4
- **d)** None of the above

Answer: (d)

48. The system of equations $4x + 6y = 5, 8x + 12y = 10$ has:

- **a)** No solution.
- **b)** Infinitely many solutions.
- **c)** A unique solution.
- **d)** None of the above

Answer: (b)

49. The system of equations $2x + 3y = 5, 6x + 9y = a$ has infinitely many solution if a is:

- **a)** 10.
- **b)** 2.
- **c)** 15.
- **d)** None of the above

Answer: (c)

50. According to determinant properties, determinant equals to zero if column is:

- **a)** Divided to row.
- **b)** Divided to column.
- **c)** Multiplied to row.
- **d)** Multiplied to column.

Answer: (d)

51. Rule which provides method of solving determinants is classified as:

- **a)** Cramer's rule.
- **b)** Determinant rule.
- **c)** Solving rule.
- **d)** None of the above.

Answer: (a)

52. Value of determinant is computed by adding multiples of one row to:

- **a)** Another dimension.
- **b)** Another row.
- **c)** Another column.
- **d)** None of the above.

Answer: (b)

53. Method in which rows and columns are cross off and minor determinants are involved if classified as:

- **a)** Method of three factors.
- **b)** Method of one factor.
- **c)** Gauss-Jordan elimination.
- **d)** None of the above.

Answer: (d)

54. What is a, if $B = \begin{bmatrix} 1 & 4 \\ 2 & a \end{bmatrix}$ is a singular matrix?

- **a)** 5.
- **b)** 8.
- **c)** 6.
- **d)** None of the above.

Answer: (b)

55. Eigen values of a square symmetric matrix are always:

- **a)** Positive.
- **b)** Real and imaginary.
- **c)** Negative.
- **d)** Real.

Answer: (d)

56. Two equivalent vectors must have the same initial point:

- **a)** False.
- **b)** True.
- **c)** May be.
- **d)** None of the above.

Answer: (a)

57. If **u** + **v** =**u** + **w**, then:

- **a)** **v** + **w.**
- **b)** **v** ≠ **w**.
- **c)** **v** = **w.**
- **d)** None of the above.

Answer: (c)

58. If (a,b,c) + (x,y,z) = (x,y,z), then (a,b,c) must be the zero vector:

- **a)** False.
- **b)** True.
- **c)** May be.
- **d)** None of the above.

Answer: (b)

59. If the vectors **v** and **w** are given, then the vector equation $3(2\boldsymbol{v} - \boldsymbol{x}) = 5\boldsymbol{x} - 4\boldsymbol{w} + \boldsymbol{v}$, can be solved for **x**:

a) True.
b) False.
c) May be.
d) None of the above.

Answer: (a)

60. Which of the following set of vectors is linearly independent?

a) $\begin{bmatrix}2\\0\\0\end{bmatrix}\begin{bmatrix}2\\2\\2\end{bmatrix}\begin{bmatrix}2\\0\\0\end{bmatrix}$

b) $\begin{bmatrix}0\\1\\-1\end{bmatrix}\begin{bmatrix}2\\-1\\1\end{bmatrix}\begin{bmatrix}2\\0\\0\end{bmatrix}$

c) $\begin{bmatrix}2\\1\\1\end{bmatrix}\begin{bmatrix}2\\2\\2\end{bmatrix}\begin{bmatrix}2\\0\\0\end{bmatrix}$

d) $\begin{bmatrix}2\\0\\0\end{bmatrix}\begin{bmatrix}2\\2\\2\end{bmatrix}\begin{bmatrix}1\\-1\\1\end{bmatrix}$

Answer: (d)

61. If A is a square matrix of order n and λ is a scalar, then the characteristic polynomial of A is obtained by expanding the determinant:

a) $|\lambda A|$
b) $|\lambda A - I|$
c) $|\lambda I - A|$
d) None of the above.

Answer: (c)

62. At least one characteristic roots of every singular matrix is equal to:

a) 1
b) 0
c) -1
d) None of the above.

Answer: (b)

63. The scalar λ is characteristic root of the matrix A if:

a) $A - \lambda I \; is \; singular$

b) $A - \lambda I \; is \; non \; singular$

c) A is singular.

d) None of the above.

Answer: (a)

64. If eigenvalue of matrix A is λ, then eigenvalue of A^2 is:

a) 1

b) $\frac{1}{\lambda}$

c) λ^2

d) None of the above.

Answer: (c)

65. If A is invertible matrix and eigenvalue of A is λ, then eigenvalue of A^{-1} is:

a) 1

b) $\frac{1}{\lambda}$

c) λ^2

d) None of the above.

Answer: (b)

66. If the determinant of a matrix A is non zero, then its eigenvalues of A are:

a) 1

b) 0

c) -1

d) Non-zero.

Answer: (d)

67. Which one of the following is an elementary matrix?

a) $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$

b) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & -3 & -3 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 0 \\ 0 & -3 \end{bmatrix}$

d) None of the above.

Answer: (c)

68. Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and let k be a scalar A. formula that relates det kA to and det A is:

a) $\det kA = k \det A$

b) $\det kA = \det(k + A)$

c) $\det A = k . \det A$

d) $\det KA = K^2 \det A.$

Answer: (d)

69. Determine which of the following sets of vectors are linearly dependent?

a) $v1 = \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}, v2 = \begin{bmatrix} 10 \\ 4 \\ 6 \end{bmatrix}$

b) $v1 = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}, v2 = \begin{bmatrix} 6 \\ 2 \\ 1 \end{bmatrix}$

c) $v1 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, v2 = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$

d) None of the above.

Answer: (a)

70. A null space is a vector space:

a) False.

b) True.

c) May be.

d) None of the above.

Answer: (b)

71. If two row interchanges are made in succession, then the new determinant:

a) Equals to -1 times the old determinant.

b) Equals to the old determinant.

c) Both (a) and (b).

d) None of the above.

Answer: (b)

72. The determinant of A is the product of the pivots in any echelon form U of A, multiplied by $(-1)^r$ where r is:

a) The number of rows of A.

b) The number of rows of U.

c) The number of row interchanges made during row echelon reduction from A to U.

d) None of the above.

Answer: (c)

73. A square matrix $A = [a_{ij}]$ is lower triangular if and only if $a_{ij} = 0$ for:

a) $i > j$

b) $i < j$

c) $i = j$

d) None of the above.

Answer: (a)

74. The product of upper triangular matrices is:

- **a)** Lower triangular matrix.
- **b)** Diagonal matrix.
- **c)** Upper triangular matrix.
- **d)** None of the above.

Answer: (c)

75. A system of linear equations is said to be homogeneous if it can be written in the form:

- **a)** $AX = B$
- **b)** $AB = X$
- **c)** $X = A^{-1}$
- **d)** $AX = 0$

Answer: (d)

76. Which of the following is not a linear equation?

- **a)** $x_1 + 4x_2 + 1 = x_3$
- **b)** $x_1 + 4x_1x_2 - \sqrt{2}x_3 = \sqrt{4}$
- **c)** $x_1 = 1$
- **d)** None of the above.

Answer: (b)

77. If A is a 2 x 2 matrix, the area of the parallelogram determined by the columns of A is:

- **a)** det A.
- **b)** adj A.
- **c)** Both (a) and (b).
- **d)** None of the above.

Answer: (a)

78. Cramer's rule leads easily to a general formula for:

- **a)** The adjugate of a matrix A.
- **b)** The determinant of a matrix A.
- **c)** The inverse of n x n matrix A.
- **d)** None of the above.

Answer: (c)

79. The transpose of a lower triangular matrix is:

- **a)** Lower triangular matrix.
- **b)** Upper triangular matrix.
- **c)** Diagonal matrix.
- **d)** None of the above.

Answer: (b)

80. Let A be a square matrix of order 3 x 3 with det (A)= 21, then det (2A) is:

a) 168
b) 186
c) 126
d) None of the above.

Answer: (a)

81. A basis is a linearly independent set that is as large as possible:

a) True.
b) False.
c) May be.
d) None of the above.

Answer: (a)

82. Let A be an n x n matrix. If for each b in the equation Ax=b has a solution then:

a) Columns of A span.
b) Rows of A span.
c) A has pivot position in only one row.
d) None of the above.

Answer: (c)

83. Two vectors are linearly dependent if and only if they lie:

a) On a line parallel to x-axis.
b) On the same line through origin
c) On a line parallel to y-axis.
d) None of the above.

Answer: (b)

84. Given the system $\begin{cases} x_1 - 2x_2 + x_3 = 8 \\ 2x_2 - 7x_3 = 0 \\ -4x_1 + 3x_2 + 9x_3 = -6 \end{cases}$ the augmented matrix for the system is:

a) $\begin{bmatrix} 1 & -2 & 1 \\ 0 & 2 & -7 \\ -4 & 3 & 9 \end{bmatrix}$

b) $\begin{bmatrix} 1 & -2 & 1 & 1 \\ 0 & 2 & 9 & -7 \\ -4 & 3 & 7 & 9 \end{bmatrix}$

c) $\begin{bmatrix} 1 & -2 & 1 & 1 \\ 0 & 2 & -7 & 0 \\ -4 & 3 & 9 & -6 \end{bmatrix}$

d) $\begin{bmatrix} 1 & -2 & 1 & 8 \\ 0 & 2 & -7 & 0 \\ -4 & 3 & 9 & -6 \end{bmatrix}$

Answer: (d)

85. Given the augmented matrix $\begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & -7 \\ -4 & 3 & 9 \end{bmatrix}$ the system of linear equations corresponding to the matrix is:

a) $\begin{cases} x_1 + 2x_2 + x_3 = 0 \\ 3x_1 + 2x_2 + 7x_3 = 0 \\ -4x_1 + 3x_2 + 9x_3 = 0 \end{cases}$

b) $\begin{cases} x_1 + 2x_2 = 0 \\ 3x_1 - 2x_2 = -2 \\ -4x_1 + 3x_2 + 9x_3 = 0 \end{cases}$

c) $\begin{cases} x_1 + 2x_2 = 1 \\ 3x_1 + 2x_2 = -7 \\ -4x_1 + 3x_2 = 9 \end{cases}$

d) None of the above.

Answer: (c)

86. If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 5$ then $\begin{vmatrix} a & b & c \\ 3d & 3e & 3f \\ g & h & i \end{vmatrix}$ will be:

a) 15

b) 45

c) 135

d) 60.

Answer: (a)

87. For an n x n matrix $(A^t)^t =$

a) A^t

b) A^{-1}

c) A

d) None of the above.

Answer: (c)

88. Reduced echelon form of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ is:

a) $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

b) $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

d) $\begin{bmatrix} 1 & 0 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: (b)

89. Which statement about the set S is false where $S = \{(1,1,3), (2,3,7), (2,2,6)\}$:

- **a)** The set S if linearly independent.
- **b)** The set S contain an element which is solution of the equation 5x – y.
- **c)** The set S contain two elements, which are multiple of each other.
- **d)** The set S is linearly dependent.

Answer: (a)

90. For any 3 x 3 matrix A where $\det(A) = 3$, then $\det(2A) =$

- **a)** 20
- **b)** 25
- **c)** 24
- **d)** 6

Answer: (c)

91. If Ax = b is a system of n linear equations in n unknowns such that det (A)≠ 0, then the system has:

- **a)** Infinitely many solutions.
- **b)** Unique solution.
- **c)** Both (a) and (b).
- **d)** None of the above.

Answer: (b)

92. Given the system $\begin{cases} x_1 + x_3 = 6 \\ -3x_1 + 4x_2 + 6x_3 = 30 \\ -x_1 - 2x_2 + 3x_3 = 8 \end{cases}$ the augmented matrix for the system is:

- **a)** $\begin{bmatrix} 1 & -2 & 1 \\ 0 & 2 & -7 \\ -4 & 3 & 9 \end{bmatrix}$
- **b)** $\begin{bmatrix} 1 & 1 & 0 & 6 \\ -3 & -4 & 6 & -30 \\ 1 & 2 & 3 & 8 \end{bmatrix}$
- **c)** $\begin{bmatrix} 1 & 0 & -1 & 6 \\ -3 & 4 & 6 & 30 \\ -1 & -2 & 3 & 8 \end{bmatrix}$
- **d)** $\begin{bmatrix} 1 & 0 & 1 & 6 \\ -3 & 4 & 6 & 30 \\ -1 & -2 & 3 & 8 \end{bmatrix}$

Answer: (d)

93. If A is a 3 x 3 matrix for which det(A) = 7 then det(3A)=

- **a)** 189
- **b)** 148
- **c)** 160
- **d)** 180

Answer: (a)

94. The two vectors are said to be equivalent if:

- **a)** Same length.
- **b)** Same direction.
- **c)** Both (a) and (b).
- **d)** None of the above.

Answer: (c)

95. If one of the vectors is a scalar multiple of the other, then the vectors lie on a common line, so such vectors are:

- **a)** Parallel.
- **b)** Collinear.
- **c)** Perpendicular.
- **d)** None of the above.

Answer: (b)

96. The Norm of the vector $\boldsymbol{v} = (-3, 2, 1)$ is:

- **a)** 14.
- **b)** 7.
- **c)** $\sqrt{14}$
- **d)** None of the above.

Answer: (c)

97. A vector of norm 1 is called a:

- **a)** Unit vector.
- **b)** Parallel vector.
- **c)** Zero vectors.
- **d)** None of the above.

Answer: (a)

98. The process of multiplying a nonzero vector by the reciprocal of its length to obtain a unit vector is called:

- **a)** Triangular vector.
- **b)** Normalizing.
- **c)** Cramer's rule.
- **d)** None of the above.

Answer: (b)

99. If $\boldsymbol{u} = (1, 3, -2, 7)$ and $\boldsymbol{v} = (0, 7, 2, 2)$ are two vectors then the distance between **u** and **v** is:

- **a)** 28.
- **b)** 12.
- **c)** $\sqrt{58}$
- **d)** None of the above.

Answer: (c)

100. Formula for the dot product is:

a) $\cos\theta = \frac{u.v}{\|u\|\|v\|}$

b) $\cos\theta = \frac{u+v}{\|u\|\|v\|}$

c) $\cos\theta = \frac{u.v}{\|u\|}$

d) None of the above.

Answer: (a)