IIT-JEE / ENGINEERING

MATHS

Assignment 1.0

Determinants

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Assignment 1.0

1. Using the properties of determinants prove that : [C.B.S.E. 1998]

$$\begin{vmatrix} a+b+c & -c & -b \\ -c & a+b+c & -a \\ -b & -a & a+b+c \end{vmatrix} = 2(a+b)(b+c)(c+a)$$

2. If $A = \begin{bmatrix} 4 & -5 & -11 \\ 1 & -3 & 1 \\ 2 & 3 & -7 \end{bmatrix}$ Find A^{-1}. Using A^{-1} solve the following system of linear equations. [C.B.S.E. 1998, A.I.C.B.S.E.2007]

$4x-5y-11z=12;\ x-3y+z=1;\ 2x+3y-7z=2$

3. If $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & 1 \\ 1 & -2 & 3 \end{bmatrix}$ Find A^{-1}. Using A^{-1} solve the following system of linear equations.

$x+y+z=3;\ 2x-y+z=2;\ x-2y+3z=2$ [C.B.S.E. 1998, C.B.S.E. 2006]

4. Compute the adjoint of the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$ and verify that $A.(adjA) = |A| I$.

[A.I.C.B.S.E.1998]

5. Using the properties of determinant, prove that :

$$\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$$

[A.I.C.B.S.E.1998,99; A.I.C.B.S.E. (Comptt.)2006; C.B.S.E. (Foreign) 2006]

6. If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$ Find A^{-1}. Using A^{-1} solve the following system of linear equations. [A.I.C.B.S.E.1998, C.B.S.E. (Comptt.)2007]

$2x-3y+5z=11;\ 3x+2y-4z=-5;\ x+y-2z=-3$

7. Compute the adjoint of matrix $A = \begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$ and verify that $(adjA).A = |A| I$.

[A.I.C.B.S.E.1998]

8. If $A=\begin{bmatrix}2 & -1 & 3\\ 1 & 3 & 2\\ 3 & -4 & -1\end{bmatrix}$ Find A^{-1}. Using A^{-1} solve the following system of linear equations. [A.I.C.B.S.E.1998]

$2x-y+3z=13;\ x+3y+2z=1;\ 3x-4y-z=8$

9. Using properties of determinants, show that:

$$\begin{vmatrix}1+a & 1 & 1\\ 1 & 1+b & 1\\ 1 & 1 & 1+c\end{vmatrix}=ab+bc+ca+abc$$

[A.I.C.B.S.E.(Comptt)1998;C.B.S.E.(Comptt.)2004;A.I.C.B.S.E.(Comptt.)2003, C.B.S.E. 2004]

10. If $A=\begin{bmatrix}8 & -4 & 1\\ 10 & 0 & 6\\ 8 & 1 & 6\end{bmatrix}$. Find A^{-1}. Using A^{-1} solve the following system of linear equations. [A.I.C.B.S.E.(Comptt.)1998]

$8x-4y+z=5;\ 10x+6z=4;\ 8x+y+6z=\frac{5}{2}$

11. If $A=\begin{bmatrix}3 & -2 & 1\\ 2 & 1 & -3\\ -1 & 2 & 1\end{bmatrix}$ Find A^{-1}. Using A^{-1} solve the following system of linear equations. [A.I.C.B.S.E.(Comptt.)1998]

$$3x+z-2y=2$$
$$2x+y-3z=-5$$
$$-x+2y+z=6$$

12. Prove , using the properties of determinants:

$$\begin{vmatrix}b+c & c+a & a+b\\ c+a & a+b & b+c\\ a+b & b+c & c+a\end{vmatrix}=2\begin{vmatrix}a & b & c\\ b & c & a\\ c & a & b\end{vmatrix}$$ [A.I.C.B.S.E.2007]

13. If $A=\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$ Find A^{-1} and hence prove that $A^2-4A-5I=0$.

[C.B.S.E.1999]

14. Find A^{-1} if $A=\begin{bmatrix}0 & 1 & 1\\ 1 & 0 & 1\\ 1 & 1 & 0\end{bmatrix}$. Also show that $A^{-1}=\frac{A^2-3I}{2}$.

15. Without expanding the determinant, prove that $\begin{vmatrix}1 & a & b+c\\ 1 & b & c+a\\ 1 & c & a+b\end{vmatrix}=0$.

[A.I.C.B.S.E.(Comptt.)1999]

16. Using matrix method, solve the following system of equations :

$2x - z = 3;\ 5x + y = 7;\ y + 3z = -1$ [A.I.C.B.S.E.(Comptt.)1999]

17. Without expanding the determinant, prove that $\begin{vmatrix} 1/a & a^2 & bc \\ 1/b & b^2 & ca \\ 1/c & c^2 & ab \end{vmatrix} = 0.$

[A.I.C.B.S.E.(Comptt.)1999]

18. Using matrix method, solve the following system of equations.

$x - 2y = 3;\ 2x - z = 3;\ 3y - 4z = 7$ [A.I.C.B.S.E.(Comptt.)1998]

19. Without expanding the determinant, prove that $\begin{vmatrix} 1/a & a & bc \\ 1/b & b & ca \\ 1/c & c & ab \end{vmatrix} = 0.$

[A.I.C.B.S.E.(Comptt.)1998]

20. Using matrix method, solve the following system of equations :

$5x - y = -7;\ 2x + 3z = 1;\ 3y - z = 5$ [A.I.C.B.S.E.(Comptt.)1998]

21. Using properties of determinants, prove that

$$\begin{vmatrix} 1 & a & a^3 \\ 1 & b & b^3 \\ 1 & c & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

22. Using matrices, solve the following equations for x,y and z: [C.B.S.E.2007]

$x + 2y - 3z = 6;\ 3x + 2y - 2z = 3;\ 2x - y + z = 2$

23. Using matrices, solve the following system of equations for $x_1 y_1 z$: [C.B.S.E.2000]

$x + y + z = 5;\ 2x + y - z = 2;\ 2x - y + z = 2$

24. Using properties of determinants prove that [A.I.C.B.S.E.2000]

$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ x^3 & y^3 & z^3 \end{vmatrix} = xyz(x-y)(y-z)(z-x)$$

25. Solve using matrices for x,y,z : [A.I.C.B.S.E.2000]

$x + y - z = 1; 3x + y - 2z = 3; x - y - z = -1$

26. Solve using matrices for x,y,z : [A.I.C.B.S.E.2000]

$2x - y - z = 7; 3x + y - z = 7; x + y - z = 3$

27. Prove the following using properties of determinants: [C.B.S.E.2007]

$$\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$$

28. Using matrix solve the following system of equation for x,y and z :

$x + y + z = 1; x - 2y + 3z = 2; x - 3y + 5z = 3$ [A.I.C.B.S.E.(Comptt.)2000]

29. Solve using matrics : [C.B.S.E.2001]
$x-y+z=3; 2x+y-z=2; -x-2y+2z=1$

30. Solve using matrics : [C.B.S.E.2001]
$2x-y+3z=5; 3x+2y-z=7; 4x+5y-5z=9$

31. Solve using matrics : [C.B.S.E.2001]
$2x+y+2z=3; x+y+2z=2; 2x+3y-z=-2$

32. Solve using matrics : [A.I.C.B.S.E.2001]
$3x+y+z=3; 2x-y-z=2; -x-y+z=1$

33. Using properties of determinants show that : [A.I.C.B.S.E.(Comptt.)2001]

$$\begin{vmatrix} b^2c^2 & bc & b+c \\ c^2a^2 & ca & c+a \\ a^2b^2 & ab & a+b \end{vmatrix} = 0$$

34. Using matric solve the following system of equations: [A.I.C.B.S.E.Comptt.2001]
$x+y+z=6; x+2y+3z=14; x+4y+7z=30$

35. Using properties of determinants show that : [C.B.S.E.2002]

$$\begin{vmatrix} x+y & x & x \\ 5x+4y & 4x & 2x \\ 10x+8y & 8x & 3x \end{vmatrix} = x^3$$

36. Using matrix method, solve the following system of equations: [A.I.C.B.S.E.2007]
$2x-y+z=2; 3x-z=2; x+2y=3$

37. Using the properties of determinants, show that [A.I.C.B.S.E.2002]

$$\begin{vmatrix} 1 & x+y & x^2+y^2 \\ 1 & y+z & y^2+z^2 \\ 1 & z+x & z^2+x^2 \end{vmatrix} = (x-y)(y-z)(z-x)$$

38. Using Matrix method solve the following system of linear equations:
$x+2y+3z=-4; 2x+3y+2z=2; 3x-3y-4z=11$

39. Using matrix method solve the following system of linear equations:
$x+y+z=6; 2x-y+z=3; x-2y+3z=6$ [A.I.C.B.S.E.2002]

40. Prove using the properties of determinants : [C.B.S.E.(Comptt.)2002]

$$\begin{vmatrix} 43 & 3 & 6 \\ 35 & 21 & 4 \\ 17 & 9 & 2 \end{vmatrix} = 0$$

41. Solve the following system of equations using matrices: [C.B.S.E.2002]
$5x+3y+z=16; 2x+y+3z=19; x+2y+4z=25$

42. Evaluate using the properties of determinants : [A.I.C.B.S.E.2002]

$$\begin{vmatrix} 9 & 9 & 12 \\ 1 & 3 & -4 \\ 1 & 9 & 12 \end{vmatrix}$$

43. Solve the following system of equations using matrices : [C.B.S.E.(Comptt.)2002]

$$\frac{2}{x}+\frac{3}{y}+\frac{10}{z}=4;\frac{4}{x}-\frac{6}{y}+\frac{5}{z}=1;\frac{6}{x}+\frac{9}{y}-\frac{20}{z}=2$$

44. Using the properties of determinant evaluate the following: [C.B.S.E.2003]

$$\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & bc^2 \\ a^2c & cb^2 & 0 \end{vmatrix}$$

45. Using matrix method, solve the following equations: [C.B.S.E.2002, 07]

$$x-y+z=2;2x+y-z=1;x+y+z=6$$

46. Using matrix method, solve the following equations: [C.B.S.E.2003]

$$2x+6y=2;3x-z=-8;2x-y+z=-3$$

47. Using matrix method, solve the following equations: [C.B.S.E.2003]

$$x-y+z=2;2x-y=0;2y-z=1$$

48. Using properties of determinants, show that: [C.B.S.E.2003]

$$\begin{vmatrix} a+x & y & z \\ x & a+y & z \\ x & y & a+z \end{vmatrix} = a^2(a+x+y+z)$$

49. Given that $A=\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B=\begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ Find AB. Hence use this to solve the following system of equations: [C.B.S.E.2007]

$$x-y=3;2x+3y+4z=17;y+2z=7$$

50. Given that $A=\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B=\begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$. Find AB. Use this to solve the following system of linear equations: [C.B.S.E.(Comptt.)2003]

$$x-y+z=4;x-2y-2z=9;2x+y+3z=1$$

51. Using properties of determinants, show that : [C.B.S.E.(Comptt.)2003]

$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$$

52. Using properties of determinats solve for x :

$$\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0$$

53. Using matrix method solve the following system of linear equations:
$x+y+z=3; 2x-y+z=2; x-2y+3z=2$ [C.B.S.E.2004]

54. Using matrix method solve the following system of linear equations:
$2x-3y+5z=11; 3x+2y-4z=-5; x+y-2z=-3$ [C.B.S.E.2004]

55. Using matrix method solve the following system of linear equations:
$x+y+z=1; x-2y+3z=2; x-3y+5z=3$ [C.B.S.E.2004]

56. Using properties of determinants, prove that: [A.I.C.B.S.E.2004,06]
$$\begin{vmatrix} 1 & 1 & 1 \\ \alpha & \beta & \gamma \\ \beta\gamma & \alpha\gamma & \alpha\beta \end{vmatrix} = (\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)$$

57. Using matrix method, solve the following system of linear equations:
$x+y-z=1; 3x+y-2z=3; x-y-z=-1$ [A.I.C.B.S.E.2004]

58. If $A=\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, Prove that $A^2-4A-5I=0$. Hence find A^{-1}.

59. Using properties of determinants, prove that: [A.I.C.B.S.E.2004]
$$\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2(a+b+c)(ab+bc+ca-a^2-b^2-c^2)$$

60. Using properties of determinants, prove that: [C.B.S.E.(Comptt.)2004]
$$\begin{vmatrix} y+z & z & y \\ z & z+x & x \\ y & x & x+y \end{vmatrix} = 4xyz$$

61. Using matrix method, solve the following system of linear equations:
$2x-3y+z=-1; x-2y+3z=6; -3y+2z=0$ [C.B.S.E.(Comptt.)2004]

62. Using matrix method, solve the following system of linear equations:
$2x+y-z=1; x-y+z=2; 3x+y-2z=-1$ [C.B.S.E.(Comptt.)2004]

63. Using matrix method, solve the following system of linear equations:
$3x+4y-z=23; 2x+2y-3z=20; 4x-y+2z=12$ [C.B.S.E.(Comptt.)2004]

64. Show that $\begin{vmatrix} x+1 & x+2 & x+a \\ x+2 & x+3 & x+b \\ x+3 & x+4 & x+c \end{vmatrix} = 0$, where a,b,c are in A.P.

65. Using matrices, solve the following system of linear equations: [A.I.C.B.S.E.2008]
$x+y+z=4$
$2x-y+z=-1$
$2x+y-3z=-9$

66. If $A=\begin{bmatrix}3 & 1\\ 7 & 5\end{bmatrix}$, Find x and y such that $A^2+xI=yA$. Hence find A^{-1}.[C.B.S.E.2005]

67. Using matrix method, solve the following system of linear equations:
$x+y-z=1; x-y-z=-1; 3x+y-2z=3$ [A.I.C.B.S.E.2005]

68. Using matrix method, solve the following system of linear equations:
$x+2y+z=7; x+3z=11; 2x-3y=1$ [A.I.C.B.S.E.2005,07]

69. Using matrix method, solve the following system of linear equations:
$x+y-z=1; 3x+y-2z=3; x-y-z=1$ [A.I.C.B.S.E.2005]

70. Using properties of determinants, prove that : [C.B.S.E.(Comptt.)2005]

$$\begin{vmatrix}1 & 1 & 1\\ a & b & c\\ a^3 & b^3 & c^3\end{vmatrix}=(a-b)(b-c)(c-a)(a+b+c)$$ [C.B.S.E.(Comptt.)2005]

71. If $A=\begin{bmatrix}2 & -3 & 5\\ 3 & 2 & -4\\ 1 & 1 & -2\end{bmatrix}$, Find A^{-1}. Using it to solve the following system of equations : $2x-3y+5z=16; 3x+2y-4z=-4; x+y-2z=-3$

72. Using properties of determinants, show that : [C.B.S.E.2007]

$$\begin{vmatrix}b+c & a & b\\ c+a & c & a\\ a+b & b & c\end{vmatrix}=(a+b+c)(a-c)^2$$

73. Show that the matrix $A=\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$ satisfies the equations $A^2-5A+7I=0$. Hence find A^{-1}. [A.I.C.B.S.E.2007]

74. Using matrices, solve the following system of equations:
$2x-y-z=1$
$x+y+2z=1$ [A.I.C.B.S.E.(Comptt.)2005]
$3x-2y-2z=-1$

75. Using properties of determinants, show that

$$\begin{vmatrix}1 & a & a^2-bc\\ 1 & b & b^2-ca\\ 1 & c & c^2-ab\end{vmatrix}=0$$ [A.I.C.B.S.E.(Comptt.)2005]

76. Using matrices, solve the following system of linear equations:
$3x+4y+2z=8; 2y-3z=3; x-2y+6z=-2$ [C.B.S.E.(Comptt.)2006]

77. Using matrix method, solve the following: [C.B.S.E.(Comptt.)2006]
$x-y+z=1; 2x+y-z=2; x-2y-z=4$

78. Using matrix method, solve the following: [C.B.S.E.(Comptt.)2006]
$x-2y=10; 2x+y+3z=8; -2y+z=7$

79. If $A=\begin{bmatrix}2 & 7\\ 1 & 4\end{bmatrix}$, show that $A^2-6A+I=0$ and hence find A^{-1}.

80. Using matrices, solve the following : [A.I.C.B.S.E.(Comptt.)2005]
$x-y=3; 2x+3y+4z=17, y+2z=7$

81. Using properties of determinants, prove that : [C.B.S.E.(Comptt.)2007]
$$\begin{vmatrix} a & a^2 & b+c \\ b & b^2 & c+a \\ c & c^2 & a+b \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

82. Using properties of determinants, prove that : [C.B.S.E.2006]
$$\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} = a^3+b^3+c^3-3abc$$

83. Using matrices, solve the following: [C.B.S.E.2006]
$x+2y+z=1, 2x-y+z=5, 3x+y-z=0$

84. Using matrices, solve the following: [C.B.S.E.2006]
$2x+y-3z=13, x+y-z=6, 2x-y+4z=-12$

85. Using properties of determinants, prove that : [C.B.S.E.2006]
$$\begin{vmatrix} 3a & -a+b & -a+c \\ a-b & 3b & c-b \\ a-c & b-c & 3c \end{vmatrix} = 3(a+b+c)(ab+bc+ca)$$

86. Using matrices, solve the following: [A.I.C.B.S.E.2006]
$3x-y+z=5; 2x-2y+3z=7; x+y-z=-1$

87. If $A=\begin{bmatrix}6 & 5\\ 7 & 6\end{bmatrix}$, show that $A^2-12A+I=0$. Hence find A^{-1}. [A.I.C.B.S.E.2006]

88. If $A=\begin{bmatrix}3 & 2\\ 1 & 1\end{bmatrix}$, find the value of a and b such that $A^2+Aa+bI=0$, Hence find A^{-1}.

89. Using matrices, solve the following: [C.B.S.E.(Foreign)2006]
$2x-y+z=0; x+y-z=6; 3x-y-4z=7$

90. Using matrices, solve the following: [C.B.S.E.(Foreign)2006]
$2x-y+2z=3; 2x+y+z=-1; x-3y+2z=6$

91. If $A=\begin{bmatrix}2 & 3\\ 1 & 2\end{bmatrix}$, verify that $A^2-4A+I=0$. Hence find A^{-1}.

92. Using properties of determinants, prove that : [C.B.S.E.(Foreign)2006]
$$\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$$

93. Using matrices, solve the following: [C.B.S.E.(Foreign)2006]

$2x+y-z=6; x+3y-2z=7; x-y-z=2$

94. Using properties of determinants, prove that : [C.B.S.E.(Foreign)2006]

$$\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$$

95. Using matrices, solve the following: [C.B.S.E.(Foreign)2006]

$2x+y+z=5; 3x-y-z=5; 2x+2y-z=3$

96. Using properties of determinants, prove that : [C.B.S.E.2007]

$$\begin{vmatrix} y+z & x & y \\ z+x & z & x \\ x+y & y & z \end{vmatrix} = (x+y+z)(x-z)^2$$

97. Using properties of determinants, prove that : [C.B.S.E.2007]

$$\begin{vmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$$

98. Solve the following system of equation by matrix method, where $x \neq 0, y \neq 0, z \neq 0$

$\frac{2}{x}-\frac{3}{y}+\frac{3}{z}=10; \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=10; \frac{3}{x}-\frac{1}{y}+\frac{2}{z}=13$ [C.B.S.E.(Comptt.)2007]

99. Using properties of determinants, prove that : [A.I.C.B.S.E.2007]

$$\begin{vmatrix} x+4 & 2x & 2x \\ 2x & x+4 & 2x \\ 2x & 2x & x+4 \end{vmatrix} = (5x+4)(4-x)^2$$

100. Using properties of determinants, prove that : [A.I.C.B.S.E.2007]

$$\begin{vmatrix} x-3 & x-4 & x+\alpha \\ x-2 & x-3 & x-\beta \\ x-1 & x-2 & x-\gamma \end{vmatrix} = 0, \text{where } \alpha, \beta, \gamma \text{ are in A.P.}$$

101. Using matrices, solve the following: [A.I.C.B.S.E.2007]

$2x+3y+3z=5, x-2y+z=-4, 3x-y-2z=3$

102. If $\begin{vmatrix} 2x+5 & 3 \\ 5x+2 & 9 \end{vmatrix} = 0$, Find x. [C.B.S.E.(Foreign)2008]

103. Using properties of determinants, prove the following: [C.B.S.E.(Foreign)2008]

$$\begin{vmatrix} 1 & a^2+bc & a^3 \\ 1 & b^2+ca & b^3 \\ 1 & c^2+ab & c^3 \end{vmatrix} = -(a-b)(b-c)(c-a)(a^2+b^2+c^2)$$

104. Solve for x : $\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$ [C.B.S.E.(Foreign)2008]

105. Using matrices, solve the following system of linear equations:
$8x+4y+3z=18, 2x+y+z=5, x+2y+z=5$ [C.B.S.E.(Foreign)2008]

106. Show that the points (1,0),(6,0),(0,0) are collinear. [A.I.C.B.S.E.2008]

107. If $\begin{vmatrix} x+2 & 3 \\ x+5 & 4 \end{vmatrix} = 3$, Find the value of x. [A.I.C.B.S.E.2008]

108. Using properties of determinants, prove that following :

$$\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$$ [A.I.C.B.S.E.2008]

109. Using matrices, solve the following system of linear equations:
$2x-y+z=3; -x+2y-z=-4; x-y+2z=1$ [A.I.C.B.S.E.2008]

110. Using properties of determinants, prove that following : [A.I.C.B.S.E.2008]

$$\begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} = 9b^2(a+b)$$

111. Using matrices, solve the following system of linear equations:
$3x-2y+3z=8; 2x+y-z=1; 4x-3y+2z=4$ [A.I.C.B.S.E.2008]

112. If a, b and c are all positive and distinct, show that :

$\Delta = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ has a negative value. [A.I.C.B.S.E.2008]

113. Using matrices, solve the following system of linear equations:
$x+y+z=4; 2x+y-3z=-9; 2x-y+z=-1$ [A.I.C.B.S.E.2008]

114. Evaluate : $\begin{vmatrix} a+ib & c+id \\ -c+id & a-ib \end{vmatrix}$ [C.B.S.E.(Delhi)2008]

115. Find the co-factor of a_{12} in the following : $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$

116. Using properties of determinants, prove that following : [C.B.S.E.(Delhi)2008]

$$\begin{vmatrix} \alpha & \beta & \gamma \\ \alpha^2 & \beta^2 & \gamma^2 \\ \beta+\gamma & \gamma+\alpha & \alpha+\beta \end{vmatrix} = (\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)(\alpha+\beta+\gamma)$$

117. Using properties of determinants, prove that following : [C.B.S.E.(Delhi)2008]

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix} = (1+a^2+b^2)^3$$

118. Using properties of determinants, prove the following : [C.B.S.E.(Delhi)2008]

$$\begin{vmatrix} x+y+2z & x & y \\ z & y+z+2x & y \\ z & x & z+x+2y \end{vmatrix} = 2(x+y+z)^3$$

Note : if any mistake on this, kindly inform on the mail id :

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