MATHS

BOOKS - MBD MATHS (ODIA ENGLISH)

DETERMINATES

Question Bank

1. Evaluate the following determinants. $\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$

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2. Evaluate the following determinants. $\begin{bmatrix} 2 & -3 \\ 1 & -4 \end{bmatrix}$

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3. Evaluate the following determinants.

$\begin{bmatrix} \sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{bmatrix}$

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4. Evaluate the following determinants. $\begin{bmatrix} 0 & x \\ 2 & 0 \end{bmatrix}$

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5. Evaluate the following determinants. $\begin{bmatrix} 1 & \omega \\ -\omega & \omega \end{bmatrix}$

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6. Evaluate the following determinants. $\begin{bmatrix} 4 & -1 \\ 3 & 2 \end{bmatrix}$

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7. Evaluate the following determinants.

$\begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

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8. Evaluate the following determinants. $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

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9. Evaluate the following determinants. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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10. Evaluate the following determinants.

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

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11. Evaluate the following determinants.

$$\begin{bmatrix} 1 & x & y \\ 0 & \sin x & \sin y \\ 0 & \cos x & \cos y \end{bmatrix}$$

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12. Evaluate the following determinants. $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 3 & 4 & 5 \end{bmatrix}$

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13. Evaluate the following determinants.

$$\begin{bmatrix} 0.2 & 0.1 & 3 \\ 0.4 & 0.2 & 7 \\ 0.6 & 0.3 & 2 \end{bmatrix}$$

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14. Evaluate the following determinants.

$$\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{bmatrix}$$

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15. Evaluate the following determinants. $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{bmatrix}$

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16. Evaluate the following determinants.

$\begin{bmatrix} -6 & 0 & 0 \\ 3 & -5 & 7 \\ 2 & 8 & 11 \end{bmatrix}$

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17. Evaluate the following determinants. $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 5 \\ 4 & 1 & 3 \end{bmatrix}$

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18. Evaluate the following determinants.

$$\begin{bmatrix} -18 & 17 & 19 \\ 3 & 0 & 0 \\ -14 & 5 & 2 \end{bmatrix}$$

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19. State true or false. If the first and second rows of a determinant be interchanged then the sign of the determinant is changed.

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20. State true or false. If first and third rows of a determinant be interchanged then the sign of the determinant does not change.

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21. State true or false. If in a third order determinant first row be changed to second column. Second row to 1st column and third row to third column, then the value of the determinant does not change.

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22. State true or false. A row and a column of a determinant can have two or more common elements.

A. True

B. False

C.

D.

Answer:

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23. State true or false. The minor and the co-factor of the element a_{32} of a determinant of third order are equal.

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24. State true of false. $\begin{bmatrix} 3 & 1 & 3 \\ 0 & 4 & 0 \\ 1 & 3 & 1 \end{bmatrix}$ =0

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25. State true of false. $\begin{bmatrix} 6 & 4 & 2 \\ 4 & 0 & 7 \\ 5 & 3 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 4 & 5 \\ 4 & 0 & 3 \\ 2 & 7 & 3 \end{bmatrix}$

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26. State true of false. $\begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \\ 1 & 2 & 3 \end{bmatrix} = \begin{bmatrix} 4 & 2 & 3 \\ 7 & 5 & 6 \\ 3 & 1 & 2 \end{bmatrix}$

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27. Fill in the blanks with appropriate answer from the brackes. The value of $\begin{bmatrix} 0 & 8 & 0 \\ 25 & 520 & 25 \\ 1 & 410 & 0 \end{bmatrix}$ =_____

A. 0

B. 25

C. 200

D. -250

Answer:

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28. Fill in the blanks with appropriate answer from the bracket. $\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{bmatrix}$ =_____

A. 1

B. 0

C. ω

D. ω^2

Answer:

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29. Fill in the blanks with appropriate answer from the brackes. $\begin{bmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{bmatrix}$ =_____

A. a+b-c

B. (a+b+c)^2

C. 0

D. 1+a+b+c

Answer:

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30. Fill in the blanks with appropriate answer from the brackes. If $\begin{bmatrix} a & b & c \\ b & a & b \\ x & b & c \end{bmatrix}$ =0, then x=_____

A. a

B. b

C. c

D. a+b+c

Answer:

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31. Fill in the blanks with appropriate answer from the brackets. $\begin{bmatrix} a_1+a_2 & a_3+a_4 & a_5 \\ b_1+b_2 & b_3+b_4 & b_5 \\ c_1+c_2 & c_3+c_4 & c_5 \end{bmatrix}$ can be expressed at the most as _____, different 3rd order determinants.

A. 1

B. 2

C. 3

D. 4

Answer:

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32. Fill in the blanks with appropriate answer from the brackes. Minimum value of $\begin{bmatrix} \sin x & \cos x \\ -\cos x & 1+\sin x \end{bmatrix}$ is _____

A. -1

B. 0

C. 1

D. 2

Answer:

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33. Fill in the blanks with appropriate answer from the brackes. The determinant $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 6 \end{bmatrix}$ is equal to _____.

A. $\begin{bmatrix} 2 & 1 & 1 \\ 2 & 2 & 3 \\ 2 & 3 & 6 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 3 \\ 4 & 3 & 6 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 2 & 1 \\ 1 & 5 & 3 \\ 1 & 9 & 6 \end{bmatrix}$

D. $\begin{bmatrix} 3 & 1 & 1 \\ 6 & 2 & 3 \\ 10 & 3 & 6 \end{bmatrix}$

Answer:

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34. Fill in the blanks with appropriate answer from the brackets. With 4 different elements we can construct _____ number of different determinants of order 2.

A. 1

B. 6

C. 8

D. 24

Answer:

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35. Solve the following : $\begin{bmatrix} 4 & x+1 \\ 3 & x \end{bmatrix}$=5

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36. Solve the following : $\begin{bmatrix} x & a & a \\ m & m & m \\ b & x & b \end{bmatrix}$=0

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37. Solve the following : $\begin{bmatrix} 7 & 6 & x \\ 2 & x & 2 \\ x & 3 & 7 \end{bmatrix}$=0

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38. Solve the following : $\begin{bmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{bmatrix}=0$

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39. Solve the following : $\begin{bmatrix} 1+x & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+x \end{bmatrix}=0$

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40. Solve the following : $\begin{bmatrix} 1 & 4 & 20 \\ 1 & -2 & 5 \\ 1 & 2x & 5x^2 \end{bmatrix}=0$

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41. Solve the following : $\begin{bmatrix} x+1 & \omega & \omega^2 \\ \omega & x+\omega^2 & 1 \\ \omega^2 & 1 & x+\omega \end{bmatrix}$ =0

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42. Solve the following : $\begin{bmatrix} 2 & 2 & x \\ -1 & x & 4 \\ 1 & 1 & 1 \end{bmatrix}$ =0

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43. Solve the following : $\begin{bmatrix} x & 1 & 3 \\ 1 & x & 1 \\ 3 & 6 & 3 \end{bmatrix}$ =0

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44. Evaluate the following : $\begin{bmatrix} 2 & 3 & 4 \\ 1 & -1 & 3 \\ 4 & 1 & 10 \end{bmatrix}$

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45. Evaluate the following : $\begin{bmatrix} x & 1 & 2 \\ y & 3 & 1 \\ z & 2 & 2 \end{bmatrix}$

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46. Evaluate the following : $\begin{bmatrix} x & 1 & -1 \\ 2 & y & 1 \\ 3 & -1 & z \end{bmatrix}$

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47. Evaluate the following : $\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$

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48. Evaluate the following : $\begin{bmatrix} 8 & -1 & -8 \\ -2 & -2 & -2 \\ 3 & -5 & -3 \end{bmatrix}$

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49. Evaluate the following : $\begin{bmatrix} \sin^2\theta & \cos^2\theta & 1 \\ \cos^2\theta & \sin^2\theta & 1 \\ -10 & 12 & 2 \end{bmatrix}$

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50. Evaluate the following : $\begin{bmatrix} -1 & 3 & 2 \\ 1 & 3 & 2 \\ 1 & -3 & -1 \end{bmatrix}$

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51. Evaluate the following : $\begin{bmatrix} 11 & 23 & 31 \\ 12 & 19 & 14 \\ 6 & 9 & 7 \end{bmatrix}$

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52. Evaluate the following : $\begin{bmatrix} 37 & -3 & 11 \\ 16 & 2 & 3 \\ 5 & 3 & -2 \end{bmatrix}$

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53. Evaluate the following : $\begin{bmatrix} 2 & -3 & 4 \\ -4 & 2 & -3 \\ 11 & -15 & 20 \end{bmatrix}$

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54. Show that x=1 is a solution of

$$\begin{bmatrix} x+1 & 3 & 5 \\ 2 & x+2 & 5 \\ 2 & 3 & x+4 \end{bmatrix} = 0$$

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55. Show that (a+1) is a factor of

$$\begin{vmatrix} a+1 & 2 & 3 \\ 1 & a+1 & 3 \\ 3 & -6 & a+1 \end{vmatrix} = 0$$

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56. Show that

$$\begin{bmatrix} a_1 & b_1 & -c_1 \\ -a_2 & b_2 & c_2 \\ a_3 & b_3 & -c_3 \end{bmatrix} = \begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}$$

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57. Prove that the following.

$$\begin{bmatrix} a & b & c \\ x & y & z \\ p & q & r \end{bmatrix} = \begin{bmatrix} y & b & q \\ x & a & p \\ z & c & r \end{bmatrix} = \begin{bmatrix} x & y & z \\ p & q & r \\ a & b & c \end{bmatrix}$$

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58. Prove that the following.

$$\begin{bmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{bmatrix}$$

= abc(1+1/a+/b+1/c)

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59. Prove that the following.

$$\begin{bmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{bmatrix} = 2\begin{bmatrix} a & b & c \\ p & q & r \\ x & y & z \end{bmatrix}$$

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60. Prove that the following.

$$\begin{bmatrix} (a+1)(a+2) & a+2 & 1 \\ (a+2)(a+3) & a+3 & 1 \\ (a+3)(a+4) & a+4 & 1 \end{bmatrix} = -2$$

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61. Prove that the following.

$$\begin{bmatrix} a+d & a+d+k & a+d+c \\ c & c+b & c \\ d & d+k & d+c \end{bmatrix} = abc$$

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62. Prove that the following.

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

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63. Prove that the following. $\begin{bmatrix} a & a^2 & a^3 \\ b & b^2 & b^3 \\ c & c^2 & c^3 \end{bmatrix}$ = abc(a-b)

(b-c)(c-a)

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64. Prove that the following.

$$\begin{bmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{bmatrix} = 4ab$$

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65. Prove that the following.

$$\begin{bmatrix} b^2+c^2 & ab & ac \\ ab & c^2+a^2 & bc \\ ca & cb & a^2+b^2 \end{bmatrix} = 4a^2b^2c^2$$

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66. Prove that the following. $\begin{bmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{bmatrix}$ =(b-c)(c-a)(a-b)(bc+ca+ab)

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67. Prove that the following.

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

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68. Prove that the following.

$$\begin{vmatrix} (v+w)^2 & u^2 & u^2 \\ v^2 & (w+u)^2 & v^2 \\ w^2 & w^2 & (u+v)^2 \end{vmatrix} = 2uvw(u+v+w)^3$$

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69. Factorize the following. $\begin{bmatrix} x+a & b & c \\ b & x+c & a \\ c & a & x+b \end{bmatrix}$

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70. Factorize the following. $\begin{bmatrix} a & b & c \\ b+c & c+a & a+b \\ a^2 & b^2 & c^2 \end{bmatrix}$

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71. Factorize the following. $\begin{bmatrix} x & 2 & 3 \\ 1 & x+1 & 3 \\ 1 & 4 & x \end{bmatrix}$

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72. Show that by eliminating α and β from the equations.

$a_i\alpha + b\beta_i + c_i$=0, i=1,2,3 we get

$\begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}$ =0

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73. Prove the following : $\begin{bmatrix} 1 & bc & a(b+c) \\ 1 & ca & b(c+a) \\ 1 & ab & c(a+b) \end{bmatrix}$ =0

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74. Prove the following :

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

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75. Prove the following :

$$\begin{bmatrix} \sin\alpha & \cos\alpha & \cos(\alpha+\delta) \\ \sin\beta & \cos\beta & \cos(\beta+\delta) \\ \sin\alpha & \cos\gamma & \cos(\gamma+\delta) \end{bmatrix} = 0$$

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76. Prove the following :

$$\begin{bmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{bmatrix} = \left(1-x^3\right)^2$$

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77. Prove that the points : $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ are collinear if $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix} = 0$

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78. If A+B+C = π, prove that

$$\begin{bmatrix} \sin^2 A & \cot A & 1 \\ \sin^2 B & \cot B & 1 \\ \sin^2 C & \cot C & 1 \end{bmatrix} = 0$$

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79. Eliminate x,y,z from

a=x/y-z, b=y/z-x, c=z/x-y

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80. Given the equations

x=cy+bz, y=az+cx and z=bx+ay

where x,y and z are not all zero, prove that $a^2 + b^2 + c^2 + 2abc = 1$ by determinant method.

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81. If $ax+hy+g=0$, $hx+by+f=0$ and $gx+fy+c=\lambda$, find the value of λ in the form of a determinant.

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82. Write the number of solution of the following system of equation. $x-2y=0$

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83. Write the number of solution of the following system of equation. $x-y=0$ and $2x-2y=1$

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84. Write the number of solution of the following system of equation. $2x+y=2$ and $-x-1/2\ y=3$

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85. Write the number of solution of the following system of equation. $3x+2y=1$ and $x+5y=6$

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86. Write the number of solution of the following system of equation. $2x+3y+1=0$ and $x-3y-4=0$

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87. Write the number of solution of the following system of equation. $x+y+z=1$

$x+y+z=2$

$2x+3y+z=0$

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88. Write the number of solution of the following system of equation. $x+4y-z=0$

$3x-4y-z=0$

$x-3y+z=0$

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89. Write the number of solution of the following system of equation.$x+y-z=0$

$3x-y+z=0$

$x-3y+z=0$

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90. Write the number of solution of the following system of equation. $a_1x + b_1y + c_1z = 0$

$a_2x + b_2y + c_2z = 0$

$a_3x + b_3y + c_3z = 0$

and $\begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}$ =0

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91. Show that the following system is inconsistent.

(a-b)x+(b-c)y+(c-a)z=0

(b-c)x+(c-a)y+(a-b)z=0

(c-a)x+(a-b)y+(b-c)z=1

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92. The system of equations

$x+2y+3z=4$

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

$3x+4y+5z=6$ has

A. infinitely many solutions

B. no solution

C. a unique solution

D. none

Answer: A

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93. If the system of equations

$2x+5y+8z=0$

$x+4y+7z=0$

$6x+9y-z=0$

has nontrivial solution, then is equal to

A. 12

B. -12

C. 0

D. none

Answer: B

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94. The system of linear equations

x+y+z=2

2x+y-z=3

3x+2y+kz=4

has a unique solution if

A. $k \neq 0$

B. $-1 < k < 1$

C. $-2 < k < 2$

D. k=o

Answer: A

95. The equations

x+y+z=6

x+2y+3z=10

x+2y+mz=n

given infinite number of value of the triplet (x,y,z,) if

A. m=0,$n \in R$

B. m=3,$n \neq 10$

C. m=0, n=10

D. none

Answer: C

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96. The system of equations

2x-y+z=0

x-2y+z=0

x-y+2z=0 has infinite of nontrivial solutions for

A. $=1$

B. $=5$

C. $=-5$

D. no real value of

Answer: B

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97. The system of equations

$$a_1x + b_1y + c_1z = 0$$

$$a_2x + b_2y + c_2z = 0$$

$$a_3x + b_3y + c_3z = 0$$

$$\begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix} = 0$$

A. more than two solutions

B. one trivial and one nontrivial solutions

C. no solution

D. only trivial solutions

Answer: A

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98. Can the inverse of the following matric be found ?

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

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99. Can the inverse of the following matric be found

?

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

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100. Can the inverse of the following matric be found

?

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

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101. Can the inverse of the following matric be found

?

$$\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$$

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102. Can the inverse of the following matric be found

?

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

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103. Find the inverse of the following :

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

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104. Find the inverse of the following :

$$\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$$

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105. Find the inverse of the following :

$$\begin{bmatrix} 4 & -2 \\ 3 & 1 \end{bmatrix}$$

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106. Find the inverse of the following :

$$\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$$

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107. Find the inverse of the following :

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

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108. Find the inverse of the following :

$$\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$$

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109. Find the inverse of the following :

$[[i, -i], [i, i]]$

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110. Find the inverse of the following :

$\begin{bmatrix} x & -x \\ x & x^2 \end{bmatrix}$,x ne 0, x ne -1`

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111. Find the adjoint of the following matrice.

$$\begin{bmatrix} 1 & 1 & -1 \\ 2 & -1 & 2 \\ 1 & 3 & -2 \end{bmatrix}$$

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112. Find the adjoint of the following matrice.

$$\begin{bmatrix} -2 & 2 & 3 \\ 1 & 4 & 2 \\ -2 & -3 & 1 \end{bmatrix}$$

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113. Find the adjoint of the following matrice.

$$\begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 1 & 2 & 2 \end{bmatrix}$$

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114. Find the adjoint of the following matrice.

$$\begin{bmatrix} 1 & 3 & 0 \\ 2 & -1 & 6 \\ 5 & -3 & 1 \end{bmatrix}$$

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115. Find the adjoint of the following matrice.

$$\begin{bmatrix} -2 & 2 & 3 \\ 1 & 4 & 2 \\ -2 & -3 & 1 \end{bmatrix}$$

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116. Which of the following matrice is invertible?

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

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117. Which of the following matrice is invertible?

$$\begin{bmatrix} 2 & 1 & -2 \\ 1 & 2 & 1 \\ 3 & 6 & 4 \end{bmatrix}$$

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118. Which of the following matrice is invertible?

$$\begin{bmatrix} -1 & -2 & 3 \\ 2 & 1 & -4 \\ -1 & 0 & 2 \end{bmatrix}$$

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119. Which of the following matrice is invertible?

$$\begin{bmatrix} 1 & 0 & 1 \\ 2 & -2 & 1 \\ 3 & 2 & 4 \end{bmatrix}$$

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120. Examining consistency and solvability, solve the following equation by matrix method.

x-y+z=4

2x+y-3z=0

x+y+z=2

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121. Examining consistency and solvability, solve the following equation by matrix method.

$x+2y-3z=4$

$2x+4y-5z=12$

$3x-y+z=3$

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122. Examining consistency and solvability, solve the following equation by matrix method.

$2x-y+z=4$

$x+3y+2z=12$

$3x+2y+3z=16$

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123. Examining consistency and solvability, solve the following equation by matrix method.

$x+y+z=4$

$2x+5y-2x=0$

$x+7y-7z=5$

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124. Examining consistency and solvability, solve the following equation by matrix method.

$x+y+z=4$

$2x-y+3z=1$

$3x+2y-z=1$

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125. Examining consistency and solvability, solve the following equation by matrix method.

$x-2y=3$

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

$5x-3z=-1$

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126. Examining consistency and solvability, solve the following equation by matrix method.

x-y+z=4

2x+y-3z=0

x+y+z=2

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127. Given the matrices.

A= $\begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ and C= $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

write down the linear equations given by AX=C and solve it for x, y, z by matrix method.

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128. Find X, if $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \\ 2 & 1 & -1 \end{bmatrix} X = \begin{bmatrix} 6 \\ 0 \\ 1 \end{bmatrix}$

where $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$

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129. Answer the following:

If every element of a third order matrix is multiplied by 5, then how many times its determinant value becomes?

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130. Answer the following:

What is the value of x if

$$\begin{bmatrix} 4 & 1 \\ 2 & 1 \end{bmatrix}^2 = \begin{bmatrix} 3 & 2 \\ 1 & x \end{bmatrix} - \begin{bmatrix} x & 3 \\ -2 & 1 \end{bmatrix} ?$$

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131. Answer the following:

What are the values of x and y if

$$\begin{bmatrix} x & y \\ 1 & 1 \end{bmatrix} = 2, \begin{bmatrix} x & 3 \\ y & 2 \end{bmatrix} = 1 ?$$

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132. Answer the following:

What is the value of x if

$$\begin{bmatrix} x+1 & 1 & 1 \\ 1 & 1 & -1 \\ -1 & 1 & 1 \end{bmatrix} = 4 ?$$

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133. Answer the following:

What is the value of $\begin{bmatrix} o & -h & -g \\ h & o & -f \\ g & f & o \end{bmatrix}$?

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134. Answer the following:

What is the value of $\begin{bmatrix} \frac{1}{a} & 1 & bc \\ \frac{1}{b} & 1 & ca \\ \frac{1}{c} & 1 & ab \end{bmatrix}$

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135. Answer the following:

What is the co-factor of 4 in the determinant

$$\begin{bmatrix} 1 & 2 & -3 \\ 4 & 5 & 0 \\ 2 & 0 & 1 \end{bmatrix}$$

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136. Answer the following: In which inverval does the determinant

$$A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$$ lie?

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137. Answer the following:

If x+y+z=π, what is the value of

$$\Delta = \begin{bmatrix} \sin(x+y+z) & \sin B & \cos C \\ -\sin B & 0 & \tan A \\ \cos(A+B) & -\tan A & 0 \end{bmatrix}$$

Where A, B, C are the angles of triangle.

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138. Evaluate the following determinants:

$$\begin{bmatrix} 14 & 3 & 28 \\ 17 & 9 & 34 \\ 25 & 9 & 50 \end{bmatrix}$$

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139. Evaluate the following determinants:

$$\begin{bmatrix} 16 & 19 & 13 \\ 15 & 18 & 12 \\ 14 & 17 & 11 \end{bmatrix}$$

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140. Evaluate the following determinants:

$$\begin{bmatrix} 224 & 777 & 32 \\ 735 & 888 & 105 \\ 812 & 999 & 116 \end{bmatrix}$$

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141. Evaluate the following determinants:

$$\begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \\ 3 & 4 & 6 \end{bmatrix}$$

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142. Evaluate the following determinants:

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 5 & 7 \\ 8 & 14 & 20 \end{bmatrix}$$

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143. Evaluate the following determinants:

$$\begin{bmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{bmatrix}$$

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144. Evaluate the following determinants:

$$\begin{bmatrix} 1 & 0 & -5863 \\ -7361 & 2 & 7361 \\ 1 & 0 & 4137 \end{bmatrix}$$

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145. Evaluate the following determinants:

$$\begin{bmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{bmatrix}$$

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146. Evaluate the following determinants:

$$\begin{bmatrix} 0 & a^2 & b \\ b^2 & 0 & a^2 \\ a & b^2 & 0 \end{bmatrix}$$

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147. Evaluate the following determinants:

$$\begin{bmatrix} a-b & b-c & c-a \\ x-y & y-z & z-x \\ p-q & q-r & r-p \end{bmatrix}$$

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148. Evaluate the following determinants:

$$\begin{bmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{bmatrix}$$

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149. If $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{bmatrix} = 0$

what are x and y?

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150. For what value fo x

$$\begin{bmatrix} 2x & 0 & 0 \\ 0 & 1 & 2 \\ -1 & 2 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 4 \\ 0 & 3 & 5 \end{bmatrix} ?$$

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151. Solve $\begin{bmatrix} x+a & 0 & 0 \\ a & x+b & 0 \\ a & 0 & x+c \end{bmatrix} = 0$

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152. Solve $\begin{bmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{bmatrix} = 0$

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153. Solve $\begin{bmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{bmatrix} = 0$

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154. Show that x=2 is a root of

$$\begin{bmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{bmatrix} = 0$$

Solve this completely,

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155. Evaluate $\begin{bmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{bmatrix} - \begin{bmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{bmatrix}$

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156. Evaluate $\begin{bmatrix} a & a^2 - bc & 1 \\ b & b^2 - ac & 1 \\ c & c^2 - ab & 1 \end{bmatrix}$

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157. For what value of λ the system of equations

$x + y + z = 6, 4x + \lambda y - \lambda z = 0,$

3x+2y-4z=-5 deos not possess a solution?

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158. If A is a 3×3 matrix and $|A| = 2$, then which matrix is represented by $A \times adjA$?

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159. If $A = \begin{bmatrix} 0 & -\tan\left(\frac{\alpha}{2}\right) \\ \tan\left(\frac{\alpha}{2}\right) & 0 \end{bmatrix}$ show that $(I + A) = (I - A)\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ where $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

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160. Prove the following:

$$\begin{bmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{bmatrix} = 1 + a^2 + b^2 + c^2$$

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161. Prove the following:

$$\begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{bmatrix}$$

=(b-c)(c-a)(a-b)(a+b+c)

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162. Prove the following:

$$\begin{bmatrix} a & b & c \\ b & c & a \\ c & a & b \end{bmatrix} = 3abc - a^3 - b^3 - c^3$$

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163. Prove the following:

$$\begin{bmatrix} b^2 - ab & b - c & bc - ac \\ ab - a^2 & a - b & b^2 - ab \\ bc - ac & c - a & ab - a^2 \end{bmatrix} = 0$$

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164. Prove the following:

$$\begin{bmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{bmatrix} = 4a^2b^2c^2$$

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165. Prove the following:

$$\begin{bmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ca \\ (a+b)^2 & c^2 & ab \end{bmatrix}$$

$$=\left(a^2+b^2+c^2\right)(a+b+c)(b-c)(c-a)(a-b)$$

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166. Prove the following:

$$\begin{bmatrix} b+c & a+b & a \\ c+a & b+c & b \\ a+b & c+a & c \end{bmatrix}$$

$=a^3+b^3+c^3-3abc$

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167. Prove the following:

$$\begin{bmatrix} a+b+c & -c & -b \\ -c & a+b+c & -a \\ -b & -a & a+b+c \end{bmatrix}$$

=2(b+c)(c+a)(a+b)

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168. Prove the following:

$$\begin{vmatrix} ax-by-cz & ay+bx & az+cx \\ bx+ay & by-cz-ax & bz+cy \\ cx+az & ay+bz & cz-ax-by \end{vmatrix}$$

$$=\left(a^2+b^2+c^2\right)(ax+by+cz)\left(x^2+y^2+z^2\right)$$

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169. If 2s=a+b+c show that

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

$$2s^3(s-a)(s-b)(s-c)$$

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170. If $\begin{bmatrix} x & x^2 & x^3-1 \\ y & y^2 & y^3-1 \\ z & z^2 & z^3-1 \end{bmatrix} = 0$

then prove that xyz=1 when x,y,z are non zero and unequal.

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171. Without expanding show that the following determinant is equal to Ax+B where A and B are determinants of order 3 not involning x.

$$\begin{bmatrix} x^2+x & x+1 & x-2 \\ 2x^2+3x-1 & 3x & 3x-3 \\ x^2+3x+3 & 2x-1 & 2x-1 \end{bmatrix}$$

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172. If x,y,z are positive and are the pth, qth and rth terms of a G.P. then prove that

$$\begin{vmatrix} \log x & p & 1 \\ \log y & q & 1 \\ \log z & r & 1 \end{vmatrix} = 0$$

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173. If $a_1, a_2, \ldots\ldots\ldots, a_n$ are in G.P. and $a_i > 0$ for every i, then find the value of

$$\begin{bmatrix} \log a_n, \log a_{n+1}, \log a_{n+2} \\ \log a_{n+1}, \log a_{n+2}, \log a_{n+3} \\ \log a_{n+2}, \log a_{n+3}, \log a_{n+4} \end{bmatrix}$$

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174. If

$$f(x) = \begin{bmatrix} 1+\sin^2 x & \cos^2 x & 4\sin 2x \\ \sin^2 x & 1+\cos^2 x & 4\sin 2x \\ \sin^2 x & \cos^2 x & 1+4\sin 2x \end{bmatrix}$$

what is the maximum value of f(x).

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175. If $f_r(x), g_r(x), h_r(x), r = 1, 2, 3$ are polynomials in x such that

$f_r(a) = g_r(a) = h_r(a)$ and

$$F(x) = \begin{bmatrix} f_1(x) & f_2(x) & f_3(x) \\ g_1(x) & g_2(x) & g_3(x) \\ h_1(x) & h_2(x) & h_3(x) \end{bmatrix}$$

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176. If $f(x) = \begin{bmatrix} \cos x & \sin x & \cos x \\ \cos 2x & \sin 2x & 2\cos 2x \\ \cos 3x & \sin 3x & 3\cos 3x \end{bmatrix}$

find `f'(pi/2).

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