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(a) $C = \begin{bmatrix} 5 & 2 & 3 \\ 3 & -1 & 1 \\ 6 & 4 & 2 \end{bmatrix}$

$$\det(C) = -3 \begin{vmatrix} 2 & 3 \\ 4 & 2 \end{vmatrix} - 1 \begin{vmatrix} 5 & 3 \\ 6 & 2 \end{vmatrix} - 1 \begin{vmatrix} 5 & 2 \\ 6 & 4 \end{vmatrix}$$

$$= -3(4-12) - 1(10-18) - 1(20-12)$$

$$= 24 + 8 - 8 = \boxed{24}$$

(b) $D = 15 + 36 + 4 - 3 - 60 - 12$

$$= \boxed{-20}$$

(b)

$$1 \begin{vmatrix} 1 & 3 & -4 \\ 2 & 4 & -3 \\ -3 & -5 & 2 \end{vmatrix} - 2 \begin{vmatrix} 1 & 3 & -4 \\ 2 & 5 & -3 \\ -3 & -7 & 2 \end{vmatrix}$$

$$-5 \begin{vmatrix} 1 & 3 & 3 \\ 2 & 5 & 4 \\ -3 & -7 & 5 \end{vmatrix}$$

$$= (8 + 40 + 27) - 48 - 12 - 15$$

$$- 2(10 + 56 + 21) - 60 - 12 - 21$$

$$- 5(-25 - 42 - 36 + 45 + 28 + 39)$$

$$= 0 - 2(0) - 5(6) = 0$$

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(a) $1 \begin{vmatrix} -5 & 7 & 4 \\ 5 & 2 & 1 \\ -1 & 2 & -3 \end{vmatrix} - 3 \begin{vmatrix} 2 & 1 & 4 \\ 3 & 2 & 1 \\ 1 & 2 & -3 \end{vmatrix}$

$$-2 \begin{vmatrix} -2 & -5 & 7 \\ 2 & 5 & 2 \\ 1 & -1 & 2 \end{vmatrix}$$

$$= 1 \times (30 + 40 - 17 + 8 + 105 + 10)$$

$$- 3(12 + 7 + 24 - 8 + 63 + 4)$$

$$- 2(-20 - 21 - 10 - 35 + 30 - 4)$$

$$= 81 - 105$$

$$- 3(103 - 1)$$

$$- 2(-60)$$

$$= 186 + 120 - 306$$

$$= 0$$

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(a) $\begin{bmatrix} 65 & 4 \\ 9 & 25 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 5 \\ -2 \end{bmatrix}$

$$\det \begin{bmatrix} 65 & 4 \\ 9 & 25 \end{bmatrix} = 25^2 - 36 = 0$$

$$5^2 = 3, \quad 5 = \pm\sqrt{3}$$

$\therefore \pm\sqrt{3}$ are the roots of the equation

(b) $15s^2 + 45 = 0$

$$s^2 = -3$$

$$s = \pm\sqrt{-3}$$

$\therefore \pm\sqrt{-3}$

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a) 2배

b) 3배

c) 4배

d) 2배

c) 원래의 행렬은 다른 행끼리 더하는

$$\text{기본행렬 } E_1 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\det(E_1) = 1 = \det(I_n)$$

∴ 같다

e) 2배

$$\det(A) = \det(A^T)$$

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \Rightarrow \begin{bmatrix} a & d & g \\ b & e & h \\ c & f & i \end{bmatrix}$$

$$\det(A^T) = aei + bfg + chd - gec - bdi - afh$$

$$\det(A) = "$$

f) 2배

$$E_1 = \begin{bmatrix} k & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \Rightarrow \det(E_1) = k$$

g) 3배

h) 4배 → 2배가 2배가 4배!

i) 2배

j) 2배

$$\det(-A) = (-1)^n \det(A)$$

$$n=1 \text{ 일 때 } \rightarrow -1$$

$$n=2 \text{ 일 때 } \rightarrow 1$$

$$(k) \text{ 2배 } \begin{bmatrix} 1 & 2 & 3 \\ 3 & 6 & 9 \\ 2 & 4 & 6 \end{bmatrix} = A \quad \det(A) = 0$$

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a) 18 순행스 교환 → $k \det(A)$ b) -6 행바꿈 → $-\det(A)$

c) 12 2행과 3행 12배 교환

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$$\det(A) = \det(P^{-1}) \det(B) \det(P)$$

$$\therefore \det(P^{-1}) = \frac{1}{\det(P)}$$

$$\cancel{\det(P)} \det(A) = \det(B) \cancel{\det(P)}$$

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$$\det(A) = (10 + 9 + 24) - 4 - 30 - 18 = 1 - 9 = -8$$

∴ 9배

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$$\det \begin{bmatrix} x & y & z & 1 \\ 1 & 2 & -1 & 1 \\ -2 & 2 & 1 & 1 \\ 3 & 1 & 2 & 1 \end{bmatrix} = 0$$

$$x \begin{vmatrix} 2 & -1 & 1 \\ 2 & 1 & 1 \\ 3 & 2 & 1 \end{vmatrix} - y \begin{vmatrix} 1 & -1 & 1 \\ -2 & 1 & 1 \\ 3 & 2 & 1 \end{vmatrix} + z \begin{vmatrix} 1 & 2 & 1 \\ -2 & 2 & 1 \\ 3 & 1 & 1 \end{vmatrix}$$

$$= 1 \begin{vmatrix} 2 & -1 \\ -2 & 1 \\ 3 & 2 \end{vmatrix}$$

NO.

year month day ()

$$= x(2+4+1) - 1(-4+2)$$

$$- y(1-4-3-3(2-2))$$

$$+ z(2-2+6-6+12-1)$$

$$- 1(4+2+6+6+8-1)$$

$$= 4x + 13y + 11z - 23$$