

2013

1	2	3	4	5	6
B	C	D	B	A	D

$$\begin{array}{ccccccc}
 & & 1 & \frac{1}{2} & \frac{1}{3} & & \\
 7 & \underline{0} & 8 & 3^{n-1} & 2 & 1 & \frac{2}{3} \\
 & & & & & 9 & \underline{k-2} & 10 & \underline{2} \\
 & & 3 & \frac{3}{2} & 1 & & & &
 \end{array}$$

$$11 \quad a \quad (n-1)b \quad (a-b)^{n-1} \quad 12 \quad A-2E^{-1} \quad \frac{1}{2}A-E$$

$$13 \quad 14 \quad 1 \quad a \quad 2 \quad \left(\frac{3}{2}, \frac{1}{2}, 0\right)^T \quad k(1, 0, 1)^T \quad k$$

15

$${}^2 f(x) \begin{vmatrix} x & 2 & x & 1 & x & 2 & x & 3 \\ 2x & 2 & 2x & 1 & 2x & 2 & 2x & 3 \\ 3x & 2 & 3x & 2 & 3x & 5 & 3x & 5 \\ 4x & 4x & 3 & 5x & 7 & 4x & 7 \end{vmatrix} = 0$$

- (A) 4 (B) 3 (C) 2 (D) 1

C

$$\begin{vmatrix} x-2 & x-1 & x-2 & x-3 \\ 2x-2 & 2x-1 & 2x-2 & 2x-3 \\ 3x-2 & 3x-2 & 3x-5 & 3x-5 \\ 4x & 4x-3 & 5x-7 & 4x-7 \end{vmatrix} = \begin{vmatrix} x-2 & 1 & 0 & -1 \\ 2x-2 & 1 & 0 & -1 \\ 3x-2 & 0 & -3 & -3 \\ 4x & -3 & x-7 & -7 \end{vmatrix} = \begin{vmatrix} x-2 & 1 & 0 & 0 \\ 2x-2 & 1 & 0 & 0 \\ 3x-2 & 0 & -3 & -3 \\ 4x & -3 & x-7 & -10 \end{vmatrix}$$

$$\begin{vmatrix} x & 2 & 1 \\ 2x & 2 & 1 \end{vmatrix} \begin{vmatrix} 3 & 3 \\ x & 7 & 10 \end{vmatrix} = 3x(x-3)$$

$$f(x) = 0 \quad 3x(x-3) = 0 \quad x = 0 \quad x = 3. \quad f(x) = 0 \quad C.$$

$${}^3 A = 3 \quad |A| = 2, \quad \left| \left(\frac{1}{12} A \right)^{-1} (3A) \right| = \quad (\quad)$$

- (A) 3 (B) 21 (C) 54 (D) 108

D

$$kA^{-1} \quad \frac{1}{k} A^{-1} \quad A \quad |A| A^{-1}$$

$$\left(\frac{1}{12} A \right)^{-1} = 12A^{-1} \quad (3A) \quad |3A| (3A)^{-1} = 3^3 |A| \frac{1}{3} A^{-1} = 18A^{-1}$$

$$\left| \left(\frac{1}{12} A \right)^{-1} (3A) \right| = |12A^{-1} \quad 18A^{-1}| = |6A^{-1}| = (6)^3 |A^{-1}| = (6)^3 \left(\frac{1}{2} \right) = 108$$

$${}^4 \quad 1, 2, \dots, s \quad n$$

$$(A) \quad s \quad 1, 2, \dots, s-1 \quad 1, 2, \dots, s$$

$$(B) \quad 1, 2, \dots, s \quad s \quad 1, 2, \dots, s-1 \quad 1, 2, \dots, s-1$$

$$(C) \quad 1, 2, \dots, s \quad s-1 \quad 1, 2, \dots, s$$

$$(D) \quad 1', 2', \dots, s$$

B

$$A \quad s \quad 1', 2', \dots, s-1 \quad i$$

$$(i=1, 2, \dots, s-1) \quad 1 \quad (1, 0), \quad 2 \quad (2, 0) \quad 3 \quad (0, 3) \quad 3 \quad 1', 2'$$

$$2 \quad 1 \quad 2 \quad 0 \quad 3 \quad 0, \quad 1', 2', 3'$$

$$C \quad 1', 2', \dots, s$$

$$e_1 \quad (1, 0, \dots, 0) \quad e_2 \quad (0, 1, \dots, 0), \dots,$$

$$e_n \quad (0, 0, \dots, 1), \quad (1, 1, \dots, 1) \quad n \quad n-1$$

D

$$0 \quad 0 \quad 0 \quad 1 \quad 0 \quad 2 \quad \dots \quad 0 \quad s$$

$$B \quad 1', 2', \dots, s \quad 0 \quad k_i (i=1, 2, \dots, s)$$

$$k_{1-1} \quad k_{2-2} \quad \dots \quad k_{s-s} \quad 0 \quad k_s \quad 0 \quad s \quad 1', 2', \dots, s-1 \quad 1', 2', \dots, s-1$$

$$5 \quad A \quad B \quad A \quad 3 \quad -2 \quad 2 \quad A_1 \quad B \quad 2 \quad 1$$

$$B_1 \quad A_1 B_1 \quad \begin{matrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{matrix} \quad AB$$

$$(A) \quad \begin{matrix} 1 & 0 & 0 \\ 2 & 2 & 6 \\ 0 & 0 & 3 \end{matrix} \quad (B) \quad \begin{matrix} 1 & 0 & 0 \\ 2 & 2 & 6 \\ 0 & 0 & 3 \end{matrix} \quad (C) \quad \begin{matrix} 1 & 0 & 0 \\ 1 & 2 & 4 \\ 0 & 0 & 3 \end{matrix} \quad (D) \quad \begin{matrix} 1 & 0 & 0 \\ 1 & 2 & 4 \\ 0 & 0 & 3 \end{matrix}$$

A

$$A \quad A_1 \quad A_1 \quad PA \quad P$$

$$B_1 \quad BQ \quad A_1 B_1 \quad PABQ.$$

$$P \quad \begin{matrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{matrix} \quad Q \quad \begin{matrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{matrix}$$

$$A_1 \quad PA \quad B_1 \quad BQ. \quad A_1B_1 \quad PABQ$$

$$AB \quad P^{-1}A_1B_1Q^{-1} \quad \begin{matrix} 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 2 & 0 & 1 & 1 & 0 & 2 & 2 & 6 \\ 0 & 0 & 1 & 0 & 0 & 3 & 0 & 0 & 1 & 0 & 0 & 3 \end{matrix}.$$

$$6 \quad A \quad 4 \times 3 \quad r(A) \quad 1, 2, 3 \quad Ax = b \quad Ax = 0$$

?

$$(A) \quad \begin{matrix} 1 & 2 & 3 \end{matrix} \quad (B) \quad \begin{matrix} 1 & 2 & 2 & 3 \end{matrix} \quad (C) \quad \begin{matrix} 1 & 2 & 2 & 3 \end{matrix} \quad (D) \quad \begin{matrix} 2 & 1 & 3 \end{matrix}$$

 D

$$A \quad 4 \times 3 \quad r(A) \quad 1 \quad 2 \quad A \quad B$$

$$A \begin{pmatrix} 1 & 2 \end{pmatrix} \quad B \begin{pmatrix} 2 & 3 \end{pmatrix} \quad \begin{matrix} 1 & 2 & 2 & 3 \end{matrix} \quad Ax = 0 \quad C, \quad D.$$

$$7 \quad D_3 \quad \begin{vmatrix} 1 & 2 & 3 \\ 2 & 7 & 8 \\ 2 & 2 & 2 \end{vmatrix} \quad a_{ij} \quad A_{ij} \quad A_{21} \quad A_{22} \quad A_{23} \quad \underline{\hspace{2cm}}.$$

0

$$a_{31}A_{21} \quad a_{32}A_{22} \quad a_{33}A_{23} \quad 2(A_{21} \quad A_{22} \quad A_{23})$$

$$A_{21} \quad A_{22} \quad A_{23} \quad 0.$$

$$8 \quad \begin{matrix} 1, 2, 3 \\ 1, \frac{1}{2}, \frac{1}{3} \end{matrix} \quad A^T \quad A^n \quad \underline{\hspace{2cm}}.$$

$$\begin{matrix} 1 & \frac{1}{2} & \frac{1}{3} \\ 2 & 1 & \frac{2}{3} \\ 3 & \frac{3}{2} & 1 \end{matrix}$$

$$^T \quad \begin{matrix} 1 \\ 1, \frac{1}{2}, \frac{1}{3} \\ 2 \\ 3 \end{matrix} \quad 3$$

$$A^{-T} = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 1, \frac{1}{2}, \frac{1}{3} \\ 3 & 3 & \frac{3}{2} \end{pmatrix} \begin{pmatrix} 1 & \frac{1}{2} & \frac{1}{3} \\ 2 & 1 & \frac{2}{3} \\ 3 & \frac{3}{2} & 1 \end{pmatrix}$$

$$A^{n-1} = \begin{pmatrix} 1 & \frac{1}{2} & \frac{1}{3} \\ 2 & 1 & \frac{2}{3} \\ 3 & \frac{3}{2} & 1 \end{pmatrix}$$

$$9 \quad A^3 - 2A^2 - 5A - 6E = kE \quad A = k$$

$$A^3 - 2A^2 - 5A - 6E = A^3 - 2A^2 - 5A - 6E = O$$

$$A^3 - 2A^2 - 5A - 6E = 0 \quad (1)(2)(3) = 0$$

$$A^3 - 2A^2 - 5A - 6E = kE \quad A = k \quad k = 1 \quad k = 2 \quad k = 3 \quad k = 2 \quad kE = A$$

$$10 \quad A = \begin{pmatrix} 2 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & a \end{pmatrix} \quad B = \begin{pmatrix} 2 & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad r(A - E) =$$

2

$$A \sim B \quad \begin{pmatrix} 0 & 1 & b & 0 \\ 1 & a & 0 & 1 \end{pmatrix}$$

$$\left| \begin{array}{cc|cc} 1 & 1 & b & 0 \\ 1 & a & 0 & 1 \end{array} \right| \sim \left| \begin{array}{cc|cc} 1 & 1 & b & 0 \\ 0 & a-1 & -b & 1 \end{array} \right|$$

$$2 \quad a = 1 \quad 2 \quad (1-b) \quad b = a = 0 \quad b = 1$$

$$A \sim B \quad A \sim E \sim B \sim E.$$





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$$6 \quad 6E \quad A \quad x \quad 0.$$

$$6E \quad A \quad \begin{matrix} 5 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & 0 & 6 & 4 & 0 & 3 & 2 \\ 3 & 3 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \end{matrix}$$

$$_3 \quad 1, 2, 3^T$$

$$P \quad \begin{matrix} 1 & 1 & 1 \\ 1 & 0 & 2 \\ 0 & 1 & 3 \end{matrix} \quad P^{-1}AP \quad \begin{matrix} 2 \\ 2 \\ 6 \end{matrix}.$$

$$16 \quad 11$$

$$f(x_1, x_2, x_3) = ax_1^2 + ax_2^2 + (a-1)x_3^2 + 2x_1x_3 + 2x_2x_3$$

$$f$$

$$f \quad y_1^2 \quad y_2^2 \quad a \quad .$$

$$f$$

$$A \quad \begin{matrix} a & 0 & 1 \\ 0 & a & 1 \\ 1 & 1 & a \end{matrix}$$

$$|E \quad A| \quad \begin{vmatrix} a & 0 & 1 \\ 0 & a & 1 \\ 1 & 1 & a \end{vmatrix} \quad (a)[(a-1)][(a-2)]$$

$$f \quad A \quad \begin{matrix} 1 & a & 2 & a & 1 & 3 & a & 2 \end{matrix}.$$

$$f \quad y_1^2 \quad y_2^2 \quad A \quad 2 \quad 1$$