

جواب کوئیز دوم

$$x = a + at \rightarrow f_t = 1, f_x = t - 1$$

$$I = \int \sin^r(x) dx \rightarrow f(x) = \sin^r(x) \rightarrow f'(x) = r \sin(x) \cos(x) = \sin(rx) \rightarrow f''(x) = r \cos(rx) \rightarrow$$

$$M_r = \max |f''(x)| \Big|_{x \in [a, b]} = r, |E| \leq \frac{(b-a)^r}{r^n} M_r < \Delta I \rightarrow n > \sqrt{\frac{M_r (b-a)^r}{r \Delta I}} = \sqrt{\frac{r(1-0)^r}{r \cdot 4 \cdot 10^{-5}}} = 4 / 0.02 \rightarrow$$

$$n \geq 5 \rightarrow \Delta x = \frac{b-a}{n} = 0.2, A \simeq \Delta x [f(0.1) + f(0.3) + f(0.5) + f(0.7) + f(0.9)]$$

$$A \simeq 0.2 [0.1 + 0.87 + 0.23 + 0.415 + 0.614] = 0.271$$

$$|E| \leq \frac{(b-a)^r}{r^n} |f''(\xi)| = \frac{(1-0)^r}{r \cdot 4 \cdot 10^{-5}} (r) = \frac{1}{3 \cdot 10^{-5}} = 0.00033$$

-2

$$\begin{cases} x + y + z = 10 \\ x - y - 2z = 0 \\ 2x + 2y + az = 20 \end{cases} \rightarrow \begin{bmatrix} 1 & 1 & 1 & 10 \\ 1 & -1 & -2 & 0 \\ 2 & 2 & a & 20 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 1 & 1 & 10 \\ 0 & -2 & -3 & -10 \\ 0 & 0 & a-2 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 1 & 1 & 10 \\ 0 & 1 & 1/5 & 5 \\ 0 & 0 & a-2 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & -1/5 & 5 \\ 0 & 1 & 1/5 & 5 \\ 0 & 0 & a-2 & 0 \end{bmatrix}$$

$$\text{if } a \neq 2 \text{ then } \begin{bmatrix} 1 & 0 & -1/5 & 5 \\ 0 & 1 & 1/5 & 5 \\ 0 & 0 & a-2 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & -1/5 & 5 \\ 0 & 1 & 1/5 & 5 \\ 0 & 0 & 1 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 0 & 5 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 5 \\ 0 \end{bmatrix}$$

$$\text{if } a = 2 \text{ then } \begin{bmatrix} 1 & 0 & -1/5 & 5 \\ 0 & 1 & 1/5 & 5 \\ 0 & 0 & 0 & 0 \end{bmatrix} \rightarrow \text{proper answer} = \begin{bmatrix} 5 \\ 5 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & 0 & -1/5 & 0 \\ 0 & 1 & 1/5 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & -1/5 \\ 0 & 1 & 1/5 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\text{rank}(A) = \text{rank}(Ab) = 2 \rightarrow 3 - 2 = 1 = \text{number of general answer} \rightarrow \text{general answer} = \begin{bmatrix} 0/5 \\ -1/5 \\ 1 \end{bmatrix}$$

$$\text{Total answer} = \begin{bmatrix} 5 \\ 5 \\ 0 \end{bmatrix} + c \begin{bmatrix} 0/5 \\ -1/5 \\ 1 \end{bmatrix}$$