

$$i. \quad P(x) = \int x(x-1)^5 dx$$

$$R(x) = \int \frac{x^3-1}{x^2+x+1} dx$$

polinomları veriliyor.

$P(x) - R(x)$ polinomunun sabit terimi $\frac{43}{42}$ oldu-

ğuna göre, $R(x) - P(x)$ polinomunun katsayılar toplamı kaçtır?

- A) $-\frac{5}{2}$ B) $-\frac{3}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{3}{2}$

$$P(x) = \int x(x-1)^5 dx$$

$$x-1 = u \Rightarrow dx = du$$

$$x = u+1$$

$$= \int (u+1)u^5 du$$

$$= \int (u^6 + u^5) du = \frac{u^7}{7} + \frac{u^6}{6} + C_1 \Rightarrow P(x) = \frac{(x-1)^7}{7} + \frac{(x-1)^6}{6} + C_1$$

$$R(x) = \int \frac{(x-1)(x^2+x+1)}{x^2+x+1} dx = \int (x-1) dx = \frac{x^2}{2} - x + C_2$$

$$P(x) - R(x) = \frac{(x-1)^7}{7} + \frac{(x-1)^6}{6} + C_1 - \left[\frac{x^2}{2} + x - C_2 \right]$$

$C_1 - C_2 = C$

$$P(0) - R(0) = -\frac{1}{7} + \frac{1}{6} + C = \frac{43}{42} \Rightarrow \frac{1}{42} + C = \frac{43}{42} \Rightarrow C = 1$$

$$R(x) - P(x) = \frac{x^2}{2} - x + C_2 - \left[\frac{(x-1)^7}{7} + \frac{(x-1)^6}{6} - C_1 \right]$$

$C_2 - C_1 = -C$ olur.

$$R(1) - P(1) = \frac{1}{2} - 1 - 0 - 0 - 1 = \frac{1}{2} - 2 = -\frac{3}{2}$$