

$$\int x^2 \sqrt{x-1} dx$$

اوجد

$$I = \int (x-1)^{\frac{1}{2}} \cdot x^2 \cdot dx$$

الحل

$$I = \int u^{\frac{1}{2}} \cdot (u^2 + 2u + 1) du$$

$$= \int (u^{\frac{5}{2}} + 2u^{\frac{3}{2}} + u^{\frac{1}{2}}) du$$

$$= \frac{2}{\frac{7}{2}} u^{\frac{7}{2}} + 2 \cdot \frac{2}{\frac{5}{2}} u^{\frac{5}{2}} + \frac{2}{\frac{3}{2}} u^{\frac{3}{2}} + c$$

$$= \frac{2}{\frac{7}{2}} (x-1)^{\frac{7}{2}} + \frac{4}{\frac{5}{2}} (x-1)^{\frac{5}{2}} + \frac{2}{\frac{3}{2}} (x-1)^{\frac{3}{2}} + c$$

$$= \frac{2}{\frac{7}{2}} \sqrt{(x-1)^7} + \frac{4}{\frac{5}{2}} \sqrt{(x-1)^5} + \frac{2}{\frac{3}{2}} \sqrt{(x-1)^3} + c$$

(21)