$$= \frac{3}{2}\int_0^{\sqrt{7}} (x^2+9)^{-\frac{1}{2}}(2x)\,dx$$

$$= \frac{3}{2}\left[\int f(x)^{-\frac{1}{2}} f'(x)\,dx\right]$$

$$= \frac{3}{2}\frac{(x^2+9)^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} + c = \frac{3}{2}\frac{(x^2+9)^{1/2}}{1/2}$$

$$= \left[3(x^2+9)^{1/2}\right]_0^{\sqrt{7}}$$

$$= 3\left[(7+9)^{1/2} - (0+9)^{1/2}\right]$$

$$= 3\left[(16)^{1/2} - (9)^{1/2}\right] =$$

$$= 3(4-3) = 3 \text{ Ans}$$

Q8:- Evaluate $\int_0^{\pi/6} x\cos x\,dx$

Integrating by Parts.

$$\int_0^{\pi/6} x\cos x\,dx = x\sin x - \int \sin x\,(1)\,dx$$

$$= \left[x\sin x + \cos x\right]_0^{\pi/6}$$

$$= \left(\frac{\pi}{6}\sin\frac{\pi}{6} + \cos\frac{\pi}{6}\right) - (0\sin 0 + \cos 0)$$

$$= \frac{\pi}{6}\cdot\frac{1}{2} + \frac{\sqrt{3}}{2} - (0+1)$$

$$= \frac{\pi}{12} + \frac{\sqrt{3}}{2} - 1$$