

Q12: $\int \frac{e^x}{\sqrt{e^x-1}} dx$, Let $e^x-1 = z^2 \Rightarrow e^x dx = 2z dz$
 $e^x = 1+z^2$

$$\int \frac{e^x \cdot e^x dx}{\sqrt{e^x-1}} = \int \frac{(1+z^2) \cdot 2z dz}{z} = 2 \int (1+z^2) dz$$

$$= 2 \left[\int dz + \int z^2 dz \right] = 2 \left(z + \frac{z^3}{3} \right) = 2z \left(1 + \frac{z^2}{3} \right)$$

$$= 2 \sqrt{e^x-1} \left(1 + \frac{e^x-1}{3} \right) = \frac{2}{3} \sqrt{e^x-1} \left(3 + e^x - 1 \right)$$

$$= \frac{2}{3} \sqrt{e^x-1} (2 + e^x) \quad \text{Ans}$$

Q13: $\int \frac{\cos(\ln x)}{x} dx$ Let $\ln x = t \Rightarrow \frac{1}{x} dx = dt$

$$\int \cos(\ln x) \frac{1}{x} dx = \int \cos t dt = \sin t = \sin(\ln x)$$

1) $\int \frac{dx}{e^x + e^{-x}}$ 2) $\int \frac{2x+5}{\sqrt{x^2+5x+7}} dx$ 3) $\int \frac{(x+2) dx}{x^2+2x+5}$

4) $(2x+3)\sqrt{2x+1}$ Integration by ~~Partial~~ Substitution

Simple integration.

$$\int \frac{1+x}{x} dx$$

$$\int \frac{x^2-1}{x^2+1} dx$$

$$\int \frac{x^2-1}{x^2+1} dx$$

Quiz: Find $\frac{dy}{dx}$, $y = \frac{(\sqrt{x^2-1})(x+1)}{(x^3+1)^{3/2}}$

Log-Diff.