

$$\frac{2}{15} (x-9)^{\frac{3}{2}} (2a+3x) + C$$

potential Func-

Find $\int a^{x^2} \cdot x dx$, Put $x^2 = t \Rightarrow 2x dx = dt$

$$= \int a^t \cdot \frac{1}{2} dt = \frac{1}{2} \int a^t dt = \frac{1}{2} \frac{a^t}{\ln a} + C$$

$$= \frac{a^{x^2}}{2 \ln a} + C$$

$$\int a^x dx = \frac{a^x}{\ln a}$$

1) $\int e^x dx = e^x$

(2) $\int e^{ax} dx = \frac{e^{ax}}{a}$

3) $\int e^{f(x)} \cdot f'(x) dx = e^{f(x)}$

(4) $\int a^x dx = \frac{a^x}{\ln a}$

5) $\int a^{bx} dx = \frac{a^{bx}}{b \ln a}$

(6) $\int a^{f(x)} \cdot f'(x) dx = \frac{a^{f(x)}}{\ln a}$

Q11:- Evaluate $\int \frac{e^{\tan^{-1}x}}{1+x^2} dx$

$$\left| \frac{d}{dx} \tan^{-1}x = \frac{1}{1+x^2} \right|$$

Put $z = \tan^{-1}x \Rightarrow dz = \frac{1}{1+x^2} dx$

$$\int \frac{e^{\tan^{-1}x}}{1+x^2} dx = \int e^z dz = e^z = e^{\tan^{-1}x} \text{ Ans}$$

Q12:- $\int \sqrt{e^{2x} + e^{3x}} dx = \int \sqrt{1+e^x} \cdot e^x dx$

Let $1+e^x = z \Rightarrow dz = e^x dx$

$$\int \sqrt{z} dz = \frac{z^{3/2}}{3/2} + C = \frac{2}{3} (1+e^x)^{3/2} + C$$

