

Tutorial Examples :-

Ex.1: Find the inverse of the function $f(x) = (1 + x^3)^{1/5} + 2$.

Ex.2: Find $\frac{dy}{dx}$ for the following :

1) $y = \frac{(x^2+1)(x+3)^{1/2}}{(x-1)}$, $x > 1$.

2) $y = (\ln x)^3$.

3) $y = \frac{\ln x}{1+\ln x}$

4) $y = \sqrt{x(x+1)}$

5) $y = xe^x - e^x$

6) $y = e^{(\cos x + \ln x)}$

7) $y = \ln(\ln x^2)$

8) $y = e^{\sqrt{x}}$

Ex.3: Find the integrals:

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

2) $\int 8e^{(x+1)}dx$

3) $\int_{\ln 2}^{\ln 3} e^x dx$

4) $\int_0^{\pi/4} (1 + e^{\tan x}) \sec^2 x dx$

5) $\int_1^2 \frac{2 \ln x}{x} dx$

6) $\int_{\ln \frac{\pi}{6}}^{\ln \frac{\pi}{2}} 2e^x \cos(e^x) dx$

Ex.4: Find $\frac{dy}{dx}$ for the following :

1) $y = x^x$, $x > 0$

2) $y = 3^{\sin x}$

$$3) y = 2^{x^2}$$

$$4) y = \log_5 e^x$$

$$5) y = (x + 1)^x$$

$$6) y = (\sin x)^{\tan x}$$

$$7) y = \frac{1}{\log_2 x}$$

Ex.5: Find the integrals:

$$1) \int_1^{\sqrt{2}} x 2^{x^2} dx$$

$$2) \int \frac{\log_{10} x}{x} dx$$

$$3) \int_1^e x^{\ln 2 - 1} dx$$

Ex.6: Solve the equations:

$$1) 3^{\log_3 7} + 2^{\log_2 5} = 5^{\log_5 x}$$

$$2) 8^{\log_8 3} - e^{\ln 5} = x^2 - 7^{\log_7 3x}$$

Ex.7: Evaluate :

$$1) \sin \left(\cos^{-1} \frac{\sqrt{3}}{2} \right)$$

$$2) \sin^{-1}(1) - \sin^{-1}(-1)$$

$$3) \sec^{-1} \left(\tan^{-1} \frac{x}{3} \right)$$

Ex.8: Find $\frac{dy}{dx}$ for the following :

$$1) y = \sin^{-1} x^2$$

$$2) y = \sec^{-1}(5x^4)$$

$$3) \sin^{-1} y + \sec^{-1} 3x = 1$$

$$4) y = \tanh \sqrt{1 + x^2}$$

5) $y = \cosh^{-1} x$

6) $y = 2\sqrt{x} \tanh \sqrt{x}$

Ex.9: Find the integrals:

1) $\int \frac{2dx}{\sqrt{3+4x^2}}$

2) $\int_0^{\ln 2} 4e^x \sinh x \, dx$

3) $\int_0^1 \sinh^2 x \, dx$

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

5) $\int \frac{x^2 dx}{\sqrt{1-x^6}}$

6) $\int \frac{dx}{\sqrt{9-x^2}}$

7) $\int \frac{dx}{\sqrt{4x-x^2}}$

8) $\int \frac{dx}{\sqrt{3-4x^2}}$