CONTINUITY AND DIFFERENTIABILITY

LOGARITHMIC DIFFERENTIATION

EXERCISE

Q.1 The derivative of the given expression x^{a^x} is:

(A) $x^{a^x}\,[a^x x^{-1} + a^x \log a \log x]$ (B) $x^{a^x}\,[xa^x + a^x \log x]$

(C) $x^{a^x}\,[a^x + xa^x \log x]$ (D) None of these

Q.2 If $y = \log(x^x)$, then find $\frac{dy}{dx}$

(A) log (ex) (B) $\log\left(\frac{e}{x}\right)$ (C) $\log\left(\frac{x}{e}\right)$ (D) 1

Q.3 The derivative of $x^{1/x}$ is.

(A) $x^{\frac{1}{x}}\log(ex)$ (B) $x^{\frac{1}{x}}\log\left(\frac{e}{x}\right)$ (C) $x^{\frac{1}{x}}\log\left(\frac{x}{e}\right)$ (D) None of these

Q.4 If $y = e^{\log(\sin^{-1}x)}$, then what is the value of $\frac{dy}{dx}$.

(A) $\cos^{-1} x$ (B) $\frac{1}{\sin^{-1} x}$ (C) $\frac{1}{\sqrt{1-x^2}}$ (D) $\frac{x}{\sqrt{1-x^2}}$

Q.5 If $xy = e^y$, then solve $\frac{dy}{dx}$.

(A) $\frac{x}{y(y-1)}$ (B) $\frac{y}{x(y-1)}$ (C) $\frac{x(y-1)}{y}$ (D) $-\frac{x}{y(y-1)}$

Q.6 If $(\cos x)^y = (\sin y)^x$, then what is the value of $\frac{dy}{dx}$.

(A) $\frac{\log\sin y - y\tan x}{\log\cos x + x\cot y}$ (B) $\frac{\log\sin y + y\tan x}{\log\cos x - x\cot y}$

(C) $\frac{\log\sin y + y\tan x}{\log\cos x + x\cot y}$ (D) None of these

Q.7 What is the derivation of $(\tan x)^x$

(A) $x\,(\tan x)^{x-1}$ (B) $(\tan x)^x\,[\sec x + \tan x]$

(C) $(\tan x)^x\,[x \sec x \operatorname{cosec} x + \log \tan x]$ (D) $(\tan x)^x\,[\sec^2 x + x \tan x]$

Q.8 Solve $\frac{d}{dx}(x^{\log x})$

(A) $2x^{\log x - 1}.\log x$ (B) $x^{\log x - 1}$ (C) $\frac{2}{3}(\log x)$ (D) $x^{\log x - 1}.\log x$

Q.9 If $y = e^{\log \cos^{-1} x} + e^{\log \sin^{-1} x}$, where $0 < x < 1$, then which one statement is accurate.

(A) $y_1 = 0$ (B) $y_2 = 5$

(C) y_1 does not exist (D) None of these

Q.10 If $y = e^{ax+b}$, find $(y_2)_0$

(A) ae^b (B) e^b (C) a^2e^a (D) a^2e^b

Q.11 The derivative of $x^{\log x}$ is –

(A) $2x^{\log x}.\log x$ (B) $2x^{\log(x/e)} \log x$

(C) $2x^{\log(ex)}.\log x$ (D) None of these

Q.12 If $y = x^x$, find the value of $\frac{dy}{dx}$.

(A) x^x (B) $x^x \log(ex)$ (C) $x^x \log\left(\frac{x}{e}\right)$ (D) $x^{x-1} \log$

ANSWER KEY

1. (A)

2. (A)

3. (D)

4. (C)

5. (B)

6. (B)

7. (C)

8. (A)

9. (A)

10. (D)

11. (B)

12. (B)