

I. True or false

1.  $(e^{\ln x}) = 1$  (F)

IF = X (T)

2.  $(e^{-x})' = e^{-x}$  (F)

IF =  $-e^{-x}$  (T)

3.  $\lim_{n \rightarrow \infty} \frac{\sin x}{x} = 1$  (F)

IF = 0 (T)

4.  $\int \ln x dx = \frac{1}{x} + C$  (F)

5. The function  $f(x) = \frac{1}{x}$  has an inflexion point at  $x = 0$  (F)

6.  $\int_0^{\ln 3} e^x dx = 3$  (F)

IF = 2 (T)

7.  $\frac{d}{dx} \int_{\cos x}^{\sin x} t dt = 2 \sin x \cos x$  (T)

IF =  $\sin x \cos x$  (F)

II. Find the Limits

1.  $\lim_{x \rightarrow 1} \frac{(1-x)^2}{x-1} =$

2.  $\lim_{x \rightarrow 1} \frac{x^5-1}{x-1} = 5$

$$\lim_{x \rightarrow 1} \frac{x^{100}-1}{x-1} = 100$$

3.  $\lim_{x \rightarrow \infty} \frac{\ln x}{x} =$

4.  $\lim_{x \rightarrow -\infty} \frac{2x}{\sqrt{x^2-x}} =$

5.  $\lim_{x \rightarrow 0} \frac{e^{2x}-1}{e^x} =$

III. Find the horizontal asymptotes for  $f(x) = \frac{1}{1+e^{-x}}$  and  $\frac{!x!}{2x+1}$

IV. let  $y = \arcsin 2x$ . Then  $y' =$

a.  $\frac{1}{\sqrt{1-4x^2}}$

?.  $\frac{2}{\sqrt{1-4x^2}}$

b.  $\frac{1}{\sqrt{4^2-1}}$

e.  $\frac{2}{\sqrt{4x^2-1}}$

c.  $\frac{2}{\sqrt{2x^2-1}}$

V. Let  $y = x^x$ . Use logarithmic differentiation to find  $y'$  / (and Let  $y = x^{\sin x}$  )

VI. Let  $\sin y = x$ . Use implicit differentiation to find  $y'$

VII. Find the integrals

1)  $\int \cos 5 x dx =$

$$\int \cos 7 x dx =$$

2.  $\int \sin^2 x \cos x dx =$

3.  $\int \frac{9x^2 + 6x + 3}{x^2 + x^2 + x + 1} dx =$

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

4.  $\int e^x dx =$

$$\int e^{\ln x} dx =$$

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

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

6.  $\int_{-4}^1 |x + 2| dx =$

$$\int_{-3}^3 x + 2 dx =$$

7.  $\int \frac{1}{x \ln x} dx$

VIII. Evaluate the limit if, possible  $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{e^x - 1}$

IX. Differentiate:  $f(x) = \ln \sqrt{x^2 + 25}$

X. Find where the relative(local) maximum occurs on the graph of  $y = 3x^4 - 4x^3 - 12x^2 + 5$

XI. Evaluate the definite integral:  $\int_0^1 -2e^x dx$