

Review 1 Spring 1992

1.

a) Give the book's definition of $\ln(x)$.

b) Using (a) plus the fact that $\frac{1}{t^2} < \frac{1}{t} < \frac{1}{\sqrt{t}}$ for $1 < t$ show that

$$\frac{2}{3} < \ln(3) < 2\sqrt{3} - 2$$

2. Evaluate or simplify:

a) $e^{[\ln(x^2) - 2 \ln(y)]}$ b) $\ln(x^3 e^{-x^2})$ c) $3^{\log_3 7} + \log_3(3^7)$

d) $\tan^{-1}\left(\tan\left(\frac{2\pi}{3}\right)\right)$ e) $\cos\left(\sin^{-1}\left(-\frac{3}{4}\right)\right)$

3. Find the derivative of

a) $y = 3^{\tan^{-1}(x)}$ b) $y = \frac{(x+2)\sqrt{x^2-6}}{e^{4x}(x^3+2)^4}$ c) $y = \ln(\sec^{-1}(x))$

d) $y = \cos^{-1}(2x)$ e) $y = \tan^{-1}(x^2)$ f) $y = \ln(1 - e^{2x})$

4. Integrate

a) $\int x e^{x^2} dx$ b) $\int \frac{\tan^{-1}(x)}{1+x^2} dx$ c) $\int \frac{x}{1+2x^2} dx$

d) $\int 3^{1-2x} dx$ e) $\int_2^4 \frac{x}{1-x^2} dx$