

Directions: Show all work on a separate sheet of paper for full credit.

1. Differentiate the function

(a) $g(x) = (\tan^{-1}(x))^2$

(b) $h(x) = \cos^{-1}(\sin^{-1}(x))$

(c) $f(x) = \sin^{-1}(1/x)$

2. Evaluate the integral.

(a) $\int_0^{1/2} \frac{\sin^{-1}(x)}{\sqrt{1-x^2}} dx$

(b) $\int \frac{e^{2x}}{\sqrt{1-e^{4x}}} dx$

(c) $\int_0^{\pi/2} \frac{\sin(x)}{1+\cos^2(x)} dx$

3. Find the exact value of the expression.

(a) $\tan(\arctan 10)$

(b) $\tan(\sin^{-1}(2/3))$

(c) $\csc(\arccos(3/5))$

4. Simplify $\tan(\sin^{-1}(x))$.

5. Evaluate $\lim_{x \rightarrow -\infty} \tan^{-1}(e^x)$

6. Evaluate $\lim_{x \rightarrow \infty} \tan^{-1}(e^x)$