

Inverse Trigonometric Functions

1. Find the following derivatives.

(a) $f(\alpha) = \tan^{-1}(3\alpha)$.

(b) $g(\alpha) = \sin^{-1}(\alpha^2)$.

(c) $h(\alpha) = \tan^{-1}(e^\alpha)$.

(d) $f(\alpha) = \alpha \tan^{-1} \alpha$.

(e) $g(\alpha) = \frac{\cos^{-1} \alpha}{\alpha^2}$.

2. Solve the following indefinite integral problems.

(a) $\int \frac{3}{1 + \alpha^2} d\alpha$

(b) $\int \frac{5}{2 + 4\alpha^2} d\alpha$

(c) $\int \frac{1}{\sqrt{4 - 16\alpha^2}} d\alpha$

(d) $\int \frac{\alpha^3}{\sqrt{1 - \alpha^4}} d\alpha$

(e) $\int \frac{e^\alpha}{\sqrt{1 - e^{2\alpha}}} d\alpha$