1. Find the following:

(a) \( \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) \)  
(b) \( \tan^{-1}\left(\frac{1}{\sqrt{3}}\right) \)  
(c) \( \arcsin(-1) \)  
(d) \( \arctan(-1) \)  
(e) \( \cos(\arcsin(-\frac{1}{2})) \)  
(f) \( \csc(\arctan(-\frac{3}{2})) \)

2. In the following, find \( f'(x) \). You don’t need to simplify your answers.

(a) \( f(x) = x \tan^{-1}(\cos x) \)  
(b) \( f(x) = \arcsin(3x) \)  
(c) \( f(x) = \ln(\sin^{-1}(5x)) \)

3. What is the range of the function \( f(x) = 3 \arctan x \)?

4. Let \( f(x) = \arctan(x^2) \).

(a) Find the intervals on which \( f \) is increasing, and the intervals on which it is decreasing.

(b) Find the intervals on which \( f \) is concave up, and the intervals on which it is concave down.

5. Find the equation of the line tangent to the graph of \( f(x) = \tan^{-1}(e^{5x}) \) at \( x = 0 \).

6. Find the general antiderivative of each of the following:

(a) \( f(x) = \frac{1}{3\sqrt{1-x^2}} \)  
(b) \( f(x) = \frac{4}{1+x^2} - \frac{\sec x \tan x}{2} \)