Name: Section: 1 2

1. Solve the separable differential equation

$$y' = \frac{xy}{1+x^2}$$

2. Differentiate the following functions

   (a) $f(x) = 2^{x^2} + \cos(\ln x)$

   (b) $g(x) = \log_2(x^2+1) - \log_2(3)$

3. Use the methods we discussed in lecture to find the following limits.

(a) $\lim_{x \to \frac{\pi}{2}^+} \dfrac{\cos x}{1 - \sin x}$

(b) $\lim_{x \to 0^+} x \ln(\tan x)$

(c) $\lim_{x \to \infty} \left(1 + \dfrac{2}{x}\right)^{3x}$