Math 2A Worksheet: 3.3/3.4 Trigonometric Derivatives & The Chain Rule

Write your names and Student ID numbers at the top of the page

1. Use the derivatives of $\sin x$ and $\cos x$ and the quotient rule to verify the following.

   (a) $\frac{d}{dx}(\tan x) = \sec^2 x$

   (b) $\frac{d}{dx}(\sec x) = \sec x \tan x$

2. Find the limits:

   (a) $\lim_{x \to 0} \dfrac{\sin x}{\sin \pi x}$

   (b) $\lim_{x \to 0} \dfrac{\sin 3x \sin 5x}{x^2}$

3. Find the derivatives:

(a) $f(x) = x\cos x + 2\tan x$

(b) $g(\theta) = \cos^2\theta$

(c) $s(t) = \sqrt{\dfrac{1+\sin t}{1+\cos t}}$

(d) $f(t) = \tan(\sec(\cos t))$