

MAT265 HOMEWORK 08

Due Date: March 23, 2016

Name: _____

Instructions: The following exercises are similar to those found in the course text book [related text book question are in brackets]. Show ALL your work and write neatly. This assignment is due at the beginning of the class period on the date above. Group work is allowed and encouraged, but each member must write up his/her own solutions. Submissions without staples, without a name, or without work shown *will not receive credit*.

1. [§3.5, # 8] Simplify the expression, $\tan(\sin^{-1}(x))$.
2. [§3.5, # 26] Find the derivative of the function, $f(x) = x^2 \ln(\arcsin(x))$. Simplify where possible.
3. [§3.5, # 36, 38] Find the following limits:
 - a. $\lim_{x \rightarrow \infty} \arccos\left(\frac{3 + \sqrt{3}x^3}{4 + 2x^3}\right)$
 - b. $\lim_{x \rightarrow 0^+} \tan^{-1}(\ln(x))$
4. [§3.7, # 2,4,6,10,12,28,38] Find the limit. Use l'Hospital's Rule where appropriate. If there is a more elementary method, consider using it. If l'Hospital's Rule doesn't apply, explain why.
 - a. $\lim_{x \rightarrow 2} \frac{x^3 + x - 10}{x - 2}$
 - b. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos(3x)}{\cot(5x)}$
 - c. $\lim_{x \rightarrow 0} \frac{x^3}{1 - \cos(x)}$
 - d. $\lim_{x \rightarrow \infty} \frac{\ln(\sqrt{x})}{\sqrt{x}}$
 - e. $\lim_{t \rightarrow \infty} \frac{11^t - 5^t}{t}$
 - f. $\lim_{x \rightarrow \infty} x^3 \tan\left(\frac{1}{x}\right)$
 - g. $\lim_{x \rightarrow \infty} (e^x + 2x)^{\frac{1}{2x}}$
5. [§3.7, # 40] Use a graph to estimate the value of the limit of $\frac{5^x - 4^x}{3^x - 2^x}$ as x goes to zero. Then use l'Hospital's Rule to find the exact value.