Handout 5

Extra Credit

MATH 140 Lab: Section 1

Lab Instructor (TA): Mohammed Kaabar

Student's Name: Mohammed Kaabar

Student's ID: – Solution –

Note: *This handout covers the applications of exponential and logarithmic functions.*

Problem 1: Find $\lim_{n\to 0}\left(n^2 \sin\left(\frac{\pi}{n}\right)\right)$. by Sandwich Theorem, we obtain:

$-1 \le \sin\left(\frac{\pi}{n}\right) \le 1$ multiply both sides by x^2

$-n^2 \le n^2 \sin\left(\frac{\pi}{n}\right) \le n^2$ Take the limit of both sides

$\lim_{n\to 0}(-n^2) \le \lim_{n\to 0} n^2 \sin\left(\frac{\pi}{n}\right) \le \lim_{n\to 0}(n^2)$

$0 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad 0$

Therefore, $\lim_{n\to 0} n^2 \sin\left(\frac{\pi}{n}\right) = 0$

Problem 2: Find $\lim_{k\to 0}\left(\frac{3k^2+\sin(2k)}{k}\right)$.

$= \lim_{k\to 0}\left(3k + \frac{\sin(2k)}{k}\right)$

$= 3(0) + 2$

$= 0 + 2 = \boxed{2}$

Problem 3: Find $\lim_{m\to 2}\frac{|m-2|}{4-2m}$. $=$ DNE

$\lim_{m\to 2^+}\frac{(m-2)}{4-2m} = \lim_{m\to 2^+}\frac{(m-2)}{2(2-m)} = \frac{-1}{2}$

$\lim_{m\to 2^-}\frac{-(m-2)}{4-2m} = \lim_{m\to 2^-}\frac{-(m-2)}{2(2-m)} = \frac{1}{2}$

$\frac{-1}{2} \neq \frac{1}{2} \Rightarrow$ Does Not Exist (DNE)