University of Calgary Faculty of Science Department of Mathematics and Statistics

5.1

Mith 149-LUI

Worksheet 5 [The Squeeze Theorem]

1. Use the Squeeze Theorem to show that

i.
$$\lim_{x\to 0} \left(\sqrt{x^4 + x^3} \sin \left(\frac{\pi}{x} \right) \right) = 0$$

ii.
$$\lim_{x\to 0} \left(x^2 \cos \left(\frac{20\pi x}{7} \right) \right) = 0$$

- 2. If $1 \le f(x) \le (x^2 + 2x + 2)$ for all values of x, determine $\lim_{x \to -1} f(x)$.
- 3. If $3x \le f(x) \le x^3 + 2$ for $0 \le x \le 2$, determine $\lim_{x \to 1} f(x)$.
- 4. Use the Squeeze theorem to determine $\lim_{x\to 0} \left(x^4 \cos \left(\frac{4}{x} \right) \right)$
- 5. Use the Squeeze theorem to show that $\lim_{x\to 0^+} \left(\sqrt{x^3} e^{\sin\left(\frac{\pi}{x}\right)} \right) = 0$
- 6. Use the Squeeze Theorem to evaluate the following limit:

$$\lim_{x\to\infty}\left(\frac{\sin\ (x)}{x}\right)$$