Math 249~L01

Worksheet 5
[The Squeeze Theorem]

1.   Use the Squeeze Theorem to show that

   i. $\lim\limits_{x \to 0} \left(\sqrt{x^4 + x^3} \, \sin \left(\dfrac{\pi}{x} \right) \right) = 0$

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

2.   If $1 \le f(x) \le \left(x^2 + 2x + 2 \right)$ for all values of x, determine $\lim\limits_{x \to -1} f(x)$.

3.   If $3x \le f(x) \le x^3 + 2$ for $0 \le x \le 2$, determine $\lim\limits_{x \to 1} f(x)$.

4.   Use the Squeeze theorem to determine $\lim\limits_{x \to 0} \left(x^4 \cos \left(\dfrac{4}{x} \right) \right)$

5.   Use the Squeeze theorem to show that $\lim\limits_{x \to 0^+} \left(\sqrt{x^3} \, e^{\sin \left(\frac{\pi}{x} \right)} \right) = 0$

6.   Use the Squeeze Theorem to evaluate the following limit :

   $$\lim\limits_{x \to \infty} \left(\dfrac{\sin (x)}{x} \right)$$