Tutorial Session 3

1. Find the following limits using the Sandwich Theorem or the zero-times-bounded Theorem whichever easier to work with:

i) $\lim_{x\to 0} x^4\left\{3+\cos(\frac{2}{x})\right\}$

ii) $\lim_{x\to\infty} \frac{5x^3+x^2\sin x\ \cos(x-1)}{2x^3+1}$

iii) $\lim_{x\to\infty} \frac{x^2\sin x+\cos^2(\frac{x}{2})}{x^3+1}$

iv) $\lim_{x\to\infty} \frac{x^2+2\sin x}{2x^2-\cos x}$

2. Section 2.3 exercises 44 , 45 , 46 , 48 (for these questions just find the asymptotes and do not answer the part that wants you to determine whether it approaches from above or from below)

3. Consider the functions $f(x)=x^2+1$ and $g(x)=x^2+x-1$ and $h(x)=x+a$.

   i) Find the function $(g\circ f)(x)$

   ii) Find $(f\circ g)(-1)$

   iii) Find the value of a so as to have $(f\circ h)(1)=2$

4. Use the transmission property of continuous functions to calculate the limit (give reason for each step)

$$\lim_{x\to 1} \sqrt[3]{\sin^2\left(\frac{x-1}{x^2-1}\right)}$$