## Homework Assignment 1 Due on Tuesday 10/2

## Writing Problems:

1. Do the following exercise problems in the text book by Bradie,

Sec 1.2: $1\left(b^{*}, c\right), 2\left(c^{*}, d\right), 3^{*}, 4^{*}, 7^{*}, 11^{*}, 15^{*}$
Sec 1.3: 1(c), 2, $3^{*}, 12$
Sec 1.4: $1(\mathrm{a}), 7^{*}, 13$
2*. Suppose $f(x)$ is twice differentialable and $f^{\prime \prime}(x)$ is uniformly bounded, i.e, $\left|f^{\prime \prime}(x)\right|<M$ for some positive constant $M$. Show that for any fix number $a$, we have

$$
f^{\prime}(a)=\frac{f(a+h)-f(a)}{h}+O(h)
$$

Hint: Use Taylor expansion on $f(a+h)$.
We only discuss * problems in discussion section.

## Coding Problems:

1. Copy the following code on Matlab to see what happens.
\%\% Code starts here
$\mathrm{s}=0$
for $\mathrm{i}=1: 10$
$\mathrm{s}=\mathrm{s}+\mathrm{i}$
end
\%\% Code ends here
(a) What does $s$ mean in the code?
(b) How do you modify the code to compute $\sum_{i=1}^{5} i^{3}$ ?
(c) Modify the code to compute the answer for $\sum_{i=1}^{5} i^{3}, \sum_{i=1}^{2000} i^{3}$ and $\sum_{i=1}^{100000} i^{3}$. Compare the results with the formula

$$
\sum_{i=1}^{n} i^{3}=\left(\frac{n(n+1)}{2}\right)^{2}
$$

Are the answers computed by two different methods the same? If not, why?

