MATH 1500, Homework 4

1. Section 2.4: 2, 15, 28, 30, 32

2. Section 2.5: 2, 12, 16, 53, 54, 58.

3. Section 2.5, 62.

4. (Mean value theorem): Section 2.6: 30, 32. Section 2.8: 2,4,6.

5. (a) Prove that $\sin x \leq x$ for all $x \geq 0$.

    (b) You are given a function $f(x)$ with the following properties:

    $$f'(x) = \frac{\sin x}{x}; \quad f(0) = 0.$$

    Show that $f(\pi) \leq \pi$.

    (c) Find some number $a > 0$ with the property that $f(\pi) \geq a$. [If your a is sufficiently large, you will get bonus marks].

6. [BONUS] 2.8: 19.