

## Homework Assignment for Week 08

1. Section 4.6: Problems 13, 23(b), 25, 26, 28, 29, 33.
2. Read and compare the difference between Intermediate Value Theorem and Mean Value Theorem.
3. Section 5.2: Problems 34, 36, 38, 39, 46.
4. (s5.2-extra1) Evaluate

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n} \sqrt{1 - \left(\frac{k}{n}\right)^2}$$

Hint: What is the area of a circle? what does it have to do with this problem?

5. (s5.2-extra2) Use the binomial expansion for  $(k+1)^\ell$  to show by induction that

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n} \left(\frac{k}{n}\right)^\ell = \frac{1}{\ell+1}$$

Hint:  $(k+1)^{\ell+1} = k^{\ell+1} + (\ell+1)k^\ell + \cdots$ .