

Math 406-History of Calculus- Homework 2

Due date: September 17-**Submission in pairs**

- (1) Show that for every circle C there is a circumscribed regular polygon Q_n such that

$$a(Q_n) - a(C) < 2^{-n}a(C).$$

- (2) Use what you learned in calculus to show that

$$\sin(\alpha) \leq \alpha \quad \text{and} \quad \frac{\sin \alpha}{\cos(\alpha)} \geq \alpha$$

holds for all $0 \leq \alpha \leq \frac{\pi}{2}$.

- (3) Review you learned to solve

$$\int_{x_0}^{x_1} (ax + b)dx$$

Does this suffice to calculate the are of a circle segment?

- (4) (Exercise 20 p23) Show that the ratio of the volumes of two similar pyramids is equal to the ratio of the cubes of corresponding edges-not using modern calculus, but by comparing magnitudes.