

SET 3

- (1) How many real solutions are there to the equation $e^x = x^{2005}$?
- (2) Prove that for every positive integer n ,

$$\sum_{i=0}^n \binom{3n}{3i} = \frac{8^n + 2(-1)^n}{3}.$$

- (3) Show that if a rectangle is inscribed in a non-circular ellipse, the sides of the rectangle are parallel to the axes of the ellipse.