

Problem 1. Show that

$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots - \frac{1}{2n} = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{2n}$$

Problem 2. z_1, z_2, z_3 and z_4 are different points on a circle. Prove that

$$\frac{z_1 - z_3}{z_2 - z_3} : \frac{z_1 - z_4}{z_2 - z_4} \text{ is real.}$$

$$z_1, z_2, z_3, z_4 \in \mathbb{C}$$