

ADVANCED CALCULUS (REAL ANALYSIS) I

DR. MCLOUGHLIN

WORKSHEET 5

1. Let $A = [0, 3]$ and let $\mathcal{F} = \{O_i \mid O_i = ((-1)^i \left(\frac{i-1}{i}\right), 2^i) \wedge i \in \mathbb{N}_5\}$. Determine if \mathcal{F} covers A or not. What is $|\mathcal{F}|$? What is $|A|$?

Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?

2. Let $A = [0, 3]$ and let $\mathcal{G} = \{G_n \mid G_n = ((-1)^n + 1, 3 + \frac{1}{n}) \wedge n \in \mathbb{N}_4\}$. Determine if \mathcal{G} covers A or not. What is $|\mathcal{G}|$? Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?

3. Let $A = [0, 3]$ and let $\mathcal{E} = \{C_p \mid C_p = [0, 3 - \sin(\frac{p\pi}{2})] \wedge p \in \mathbb{N}\}$. Determine if \mathcal{E} covers A or not. What is $|\mathcal{E}|$? Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?

4. Let $A = [0, 3]$ and let $\mathcal{E} = \{(x - \delta, x + \delta) \mid \delta > 0 \wedge x \in A\}$. Determine if \mathcal{E} covers A or not. What is $|\mathcal{E}|$? Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?

5. Let $A = [0, 3]$ and let $\mathcal{Q} = \{(x - \frac{1}{2}, x + \frac{1}{2}) \mid x \in A\}$. Determine if \mathcal{Q} covers A or not. What is $|\mathcal{Q}|$? Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?

6. Let $A = [0, 3]$ and let $\mathcal{P} = \{(\frac{3n+6}{n+3}, \frac{3n^2+7}{n+3}) \mid n \in \mathbb{N}_5\}$. Determine if \mathcal{P} covers A or not. What is $|\mathcal{P}|$? Justify why you opine it does cover or does not cover A . If it covers A , is it an open cover?