

P.O.C.A. WONG SIU CHING SECONDARY SCHOOL
PURE MATHEMATICS
CALCULUS : CONTINUOUS FUNCTIONS
ASSIGNMENT 15

Date	Name	Grade / Score
		/15

1. Discuss the continuity of $f(x) = \begin{cases} \frac{1}{2}x + 5 & \text{if } x \leq 0 \\ x + 85 & \text{if } x > 0 \end{cases}$ at 0. (3 marks)

2. Let $f(x) = \begin{cases} 0, & x \leq 0 \\ a + b \cos px, & x \in (0,1) \\ 1, & x \geq 1 \end{cases}$. Find a and b in terms of p such that f is continuous everywhere. (5 marks)

3. Suppose $f : [0,1] \rightarrow [0,1]$ is continuous. Prove that there is some $\alpha \in [0,1]$ such that $f(\alpha) = \alpha$. (4 marks)

4. Let f be a function satisfying $|f(x) - f(y)| \leq |x - y|$ for all $x, y \in \mathbf{R}$. Show that f is continuous on \mathbf{R} . (3 marks)