

**P.O.C.A. WONG SIU CHING SECONDARY SCHOOL**  
**PURE MATHEMATICS**  
**ALGEBRA I : POLYNOMIALS**  
**ASSIGNMENT 6**

Date	Name	Grade / Score
		<b>/15</b>

1. Let  $P_n(x) = \cos(n \cos^{-1} x)$ , where  $-1 \leq x \leq 1$  and  $n$  is a non-negative integer. (8 marks)

(a) Prove that  $P_{n+1}(x) = 2xP_n(x) - P_{n-1}(x)$ .

(b) Using induction to show that  $P_n(x)$  is polynomial in  $x$  of degree  $n$  with leading coefficient  $2^{n-1}$ , for  $n \geq 1$ .

2. Given that  $f(x) = 4x^4 - 2x^3 - 16x^2 + 5x + 9$  and  $g(x) = 2x^3 - x^2 - 5x + 4$ . Find the G.C.D.  $d(x)$  of  $f(x)$  and  $g(x)$  and find polynomials  $u(x)$  and  $v(x)$  such that  $d(x) = u(x)f(x) + v(x)g(x)$ . (8 marks)