

Assignment # 4 MATH 513

1) Show the following

(a) $P_n(1) = 1$

(b) $P_n(-1) = (-1)^n$

(c) $P_{2n+1}(0) = 0$

(d) $P_{2n}(0) = 0$

(e) $P_n'(1) = (1/2) n(n+1)$

2) Write as Fourier - Legendre series (write first three non-zero terms)

(a) $f(x) = 1+x$

(b) $f(x) = |x|$

3) Use the recurrence relation to replace $P_n(x)$ and then integrate by inspection to evaluate

$$\int_0^1 P_n(x) dx$$