

## Day 4 - PM

A power series with center  $c$  is an infinite series

$$F(x) = \sum_{n=0}^{\infty} a_n (x-c)^n = a_0 + a_1(x-c) + a_2(x-c)^2 + a_3(x-c)^3 + \dots$$

Ex:  $F(x) = 1 - 2(x-3) + 3(x-3)^2 - 4(x-3)^3 + 5(x-3)^4 - \dots$

is a power series with center 3

$$F(3) = 1 - 2(0) + 3(0) - 4(0) + 5(0) - \dots = 1 \quad \text{converges}$$

$$F(4) = 1 - 2 + 3 - 4 + 5 - 6 + \dots \quad \text{diverges}$$

convergence depends on the value of  $x$ .

The Taylor series of  $f(x)$  centered at  $x=c$  is

$$T(x) = f(c) + f'(c)(x-c) + \frac{f''(c)}{2!}(x-c)^2 + \frac{f'''(c)}{3!}(x-c)^3 + \dots$$

\* Practice with HW 4.