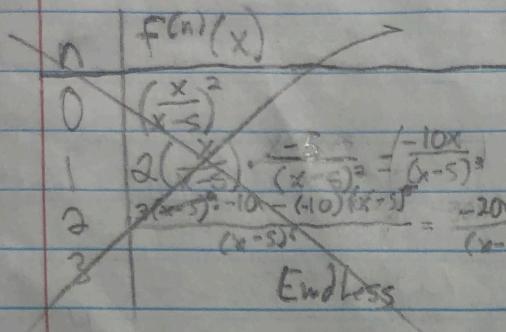


3.27

$$P(x) = f(c) + f'(c)(x-c) + \frac{f''(c)(x-c)^2}{2!} + \frac{f'''(c)}{3!}(x-c)^3$$

$$5. \frac{x^2}{(x-5)^2} = \left(\frac{x}{x-5}\right)^2 = \left(\frac{1}{1-\frac{5}{x}}\right)^2 = \frac{1}{(1-\frac{5}{x})^2} = \sum_{n=0}^{\infty} \left(\frac{5}{x}\right)^n$$



$$6. f(x) = x^{10} e^{2x} = (x^5 e^x)^2 \quad f^{(4)}(0) = 8! c_8$$

$$f(x) \rightarrow \sum_{n=0}^{\infty} \frac{x^{2n+10}}{n!} \quad \boxed{n \neq 1 \quad f^{(8)}(0) = 0}$$

$$7. \cos(x) = \sum_{n=0}^{\infty} (-1)^n \frac{(x^{\frac{3}{2}})^{2n}}{(2n)!} = \sum_{n=0}^{\infty} \frac{(-1)^n x^{3n}}{(2n)!}$$

b. Ratio Test

$$\text{Abs} \lim_{n \rightarrow \infty} \frac{(-1)^n x^{3n}}{(2n+2)(2n)!} \cdot \frac{(2n)!}{(-1)^n x^{3n}} = x^{3n} \lim_{n \rightarrow \infty} \frac{-1}{(2n+2)} \stackrel{0 < 1}{=} \text{Abs}$$

$$R = \infty \quad \text{IOC}(-\infty, \infty)$$

c. The power series for  $\cos(x^{\frac{3}{2}})$  is not a correct representation of the function because the IOC is from  $(-\infty, \infty)$  however,  $\cos(x^{\frac{3}{2}})$  domain is restricted to  $x > 0$ , Excluding half of the IOC's possibilities.