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Section: 7 8

1. Find the Maclaurin series for $f(x) = 2^x$. Recall $\frac{d}{dx}2^x = 2^x \ln 2$.

$$f(x) = 2^x$$

$$\Rightarrow f(0) = 1$$

$$f'(x) = 2^x \cdot \ln 2$$

$$\Rightarrow f'(0) = \ln 2$$

$$f''(x) = 2^x \cdot (\ln 2)^2$$

$$\Rightarrow f''(0) = (\ln 2)^2$$

$$f'''(x) = 2^x \cdot (\ln 2)^3$$

$$\Rightarrow f'''(0) = (\ln 2)^3$$

$$\vdots$$

$$f^{(n)}(x) = 2^x \cdot (\ln 2)^n$$

$$\Rightarrow f^{(n)}(0) = (\ln 2)^n$$

$$T(x) = \sum_{n=0}^{\infty} \frac{(\ln 2)^n}{n!} x^n$$