

1. Consider $f(x) = \frac{1}{1-x}$. Find:

(a) $f'(x)$ and $f'(0)$

(b) $f''(x)$ and $f''(0)$

(c) $f^{(3)}(x)$ and $f^{(3)}(0)$

(d) $f^{(4)}(x)$ and $f^{(4)}(0)$

(e) $f^{(n)}(x)$ and $f^{(n)}(0)$

2. List equations for the first 4 non-zero terms of the Maclaurin series for:

(a) e^x

(b) $\sin(x)$

(c) $\cos(x)$

3. Determine whether each series converges or not. Explain. For any series which does converge, find the sum.

(a) $\sum_{n=2}^{\infty} \frac{1}{3^n}$

(b) $\sum_{n=0}^{\infty} \frac{3^n}{8^{2n+1}}$

(c) $\sum_{n=5}^{\infty} \frac{10^n}{11^n}$

(d) $\sum_{n=1}^{\infty} \frac{3^n}{3^{n+4}}$

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