

1. A Taylor series centered at $a = 0$ is sometimes called a *Maclaurin series*.
 - (a) What does “centered at a ” mean?
 - (b) Draw a Venn diagram to show the relationship between “Taylor series” and “Maclaurin series.”

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

Find:

- | | |
|-----------------------------------|-----------------------------------|
| (a) $f'(x)$ and $f'(0)$ | (d) $f^{(4)}(x)$ and $f^{(4)}(0)$ |
| (b) $f''(x)$ and $f''(0)$ | (e) $f^{(n)}(x)$ and $f^{(n)}(0)$ |
| (c) $f^{(3)}(x)$ and $f^{(3)}(0)$ | |

3. List equations for the first 4 non-zero terms of the Maclaurin series for:
 - (a) e^x
 - (b) $\sin(x)$
 - (c) $\cos(x)$

4. Demonstrate how to use a Maclaurin series (*not* L'Hôpital's rule) to evaluate

$$\lim_{x \rightarrow 0} \frac{\sin x - x}{x^3}$$

.