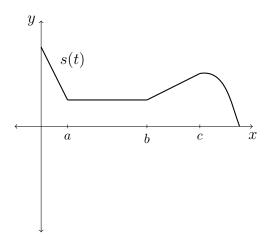
Objectives:

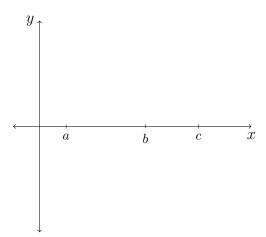
- Determine whether or not a given function is differentiable
- Compute derivatives of functions
- Recognize when an expression is the derivative of another function

In the last project, we worked with the derivative function:

Example: Given the graph of the position of an object, s(t), graph the velocity of the object, v(t).

Note: $v(t) = \underline{\hspace{1cm}}$.





Example: This limit is the derivative of which function?

$$\lim_{h \to 0} \frac{\sin(x+h) - \sin(x)}{h}$$

Example: What about this limit? Is it a derivative for some function?

$$\lim_{h \to 0} \frac{e^h - 1}{h}$$

Notation: Given a function y = f(x), we write the derivative as

Higher order derivatives: We can find the derivative of f'(x) which is called a "second derivative"

and is written _____ or .

If s(t) is a function representing position over time, then s'(t) gives _____ and s''(t) gives

_____ . Also, s'''(t) is called _____ .

Non-differentiable functions:

Example: Prove that $g(x) = x^{1/3}$ is not differentiable at x = 0.

Fact: A function f that is differentiable at a is also continuous at a.