

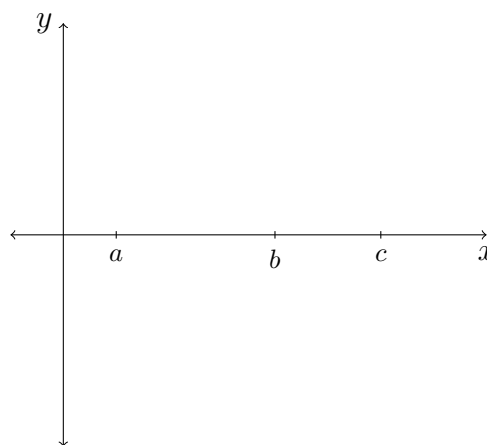
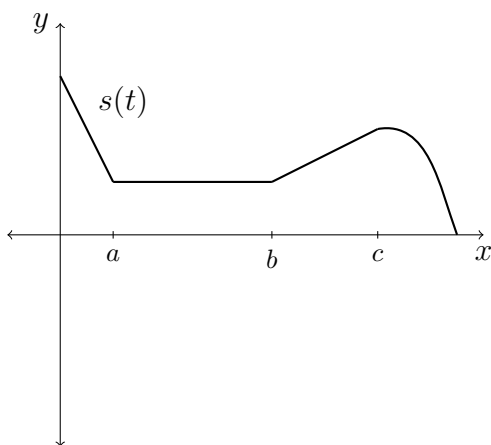
Objectives:

- 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: $v(t) =$ _____.



Example: This limit is the derivative of which function?

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

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

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

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

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 .