6.1 Videos Guide

6.1a

Definition: (one-to-one)

- A function f is one-to-one if $f(x_2) \neq f(x_1)$ whenever $x_2 \neq x_1$.

- A description of inverse functions

6.1b

Theorems (statement and proof):

- If f is one-to-one and continuous on $[a, b]$, then f^{-1} is also continuous.
- $(f^{-1})'(a) = \frac{1}{f'(f^{-1}(a))}$

6.1c

Exercises:

- If $f(x) = x^5 + x^3 + x$, find $f^{-1}(3)$ and $f\left(f^{-1}(2)\right)$.
- Find $(f^{-1})'(a)$ for $f(x) = x^3 + 3\sin x + 2\cos x$ and $a = 2$.

6.1d

Exercise:

- Let $f(x) = \sqrt{x-2}$ and $a = 2$.

a) Show that f is one-to-one

b) Find $(f^{-1})'(a) = \frac{1}{f'(f^{-1}(a))}$