

Lecture 3

Thursday, September 5, 2024 5:41 PM

Topics for today:

- Composite functions
- graph transformations

* Composite functions: $f \circ g$, $f \circ g \circ h$

$$x \xrightarrow{g} g(x) \xrightarrow{f} f(g(x)) = f \circ g(x)$$

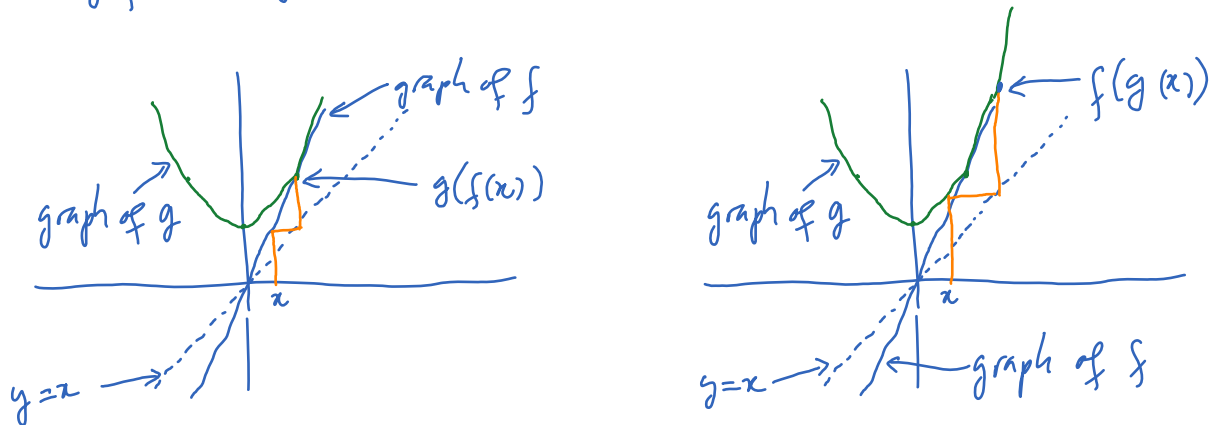
$$x \xrightarrow{h} h(x) \xrightarrow{g} g(h(x)) \xrightarrow{f} f(g(h(x)))$$

Ex $f(x) = 2x$, $g(x) = x^2 + 1$

What are the functions $f \circ g$ and $g \circ f$?

$$f \circ g(x) = f(g(x)) = 2g(x) = 2(x^2 + 1)$$

$$g \circ f(x) = g(f(x)) = f(x)^2 + 1 = (2x)^2 + 1 = 4x^2 + 1$$



Do some exercises on the worksheet.

Transformation of graphs:

$f(x-b)$: translation to the right by b units.

$f\left(\frac{x}{a}\right)$: stretch the graph horizontally by a factor of a

$f(-x)$: take mirror reflection wrt the y -axis

$af(x)$: stretch the graph vertically by a factor of a

$-f(x)$: take mirror reflection wrt the x -axis

$f(x)+b$: translate upward b units.

Do some exercises on the worksheet.