

Lecture 3

Thursday, September 29, 2022 11:51 PM

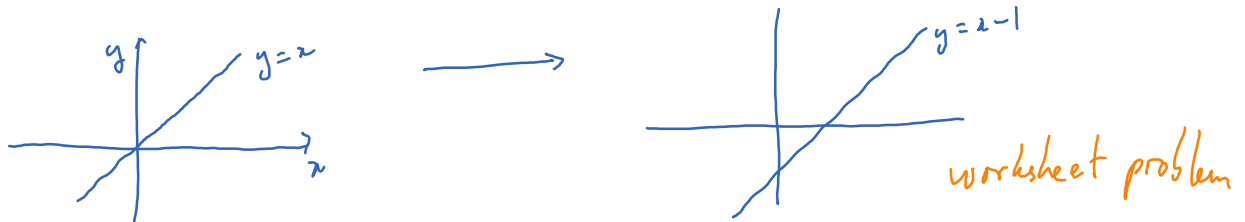
* Questions

Continue on functions:

* Properties of function (geometric/analytic)

- odd vs even
- increasing vs decreasing
- Concave vs convex
- continuous vs discontinuous

* Graph of a function:



* Algebra on functions:

$$f(x) + g(x)$$

$$f(x)g(x)$$

$$\frac{f(x)}{g(x)}$$

$$f(g(x))$$

$f(x)$

$$f(x) = x^2 + 1$$

$$g(x) = 2x$$

$$f(g(x)) = ? , g(f(x)) = ?$$

worksheet

Problem 17, page 9.

Ex Given $F(x) = \sin^2(x^2 + 9)$. Write F as composition of basic functions.

$$x \xrightarrow{\text{square}} x^2 \xrightarrow{\text{add 9}} x^2 + 9 \xrightarrow{\text{take sin}} \sin(x^2 + 9) \xrightarrow{\text{square}} \sin^2(x^2 + 9)$$

$$f(x) = x^2$$

$$g(x) = x + 9$$

$$h(x) = \sin(x)$$

$$x \xrightarrow{f} \xrightarrow{g} \xrightarrow{h} \xrightarrow{h} \text{final result} = f(h(g(f(x)))) \\ = f \circ h \circ g \circ f(x)$$

$$F = f \circ h \circ g \circ f.$$

Practice on piecewise function

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$