

7/11/22 (12/2, 24) (Partial) recursive Final Theory, (Chap 1) U

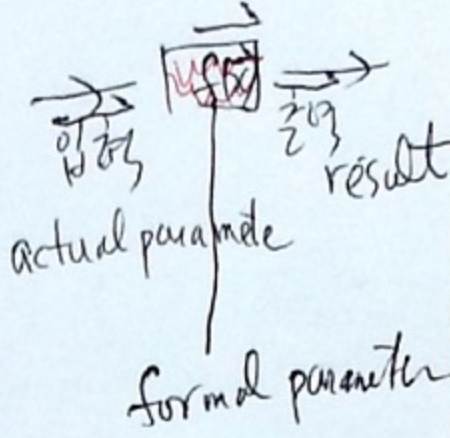
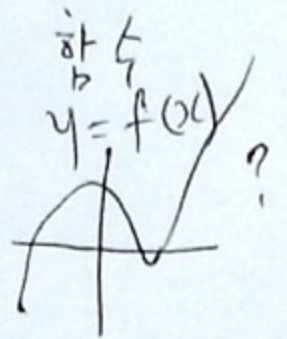
3 Functors (functional constant) <sup>(primitive)</sup>

1 zero  $f: \mathbb{N}^m \rightarrow \{0\}$

2 Successor:  $S: \mathbb{N} \rightarrow \mathbb{N}$

3 projection:  $\mathbb{N}^m \rightarrow \mathbb{N}$

Computable



3 Compositions

$f \times g = (f, g)$

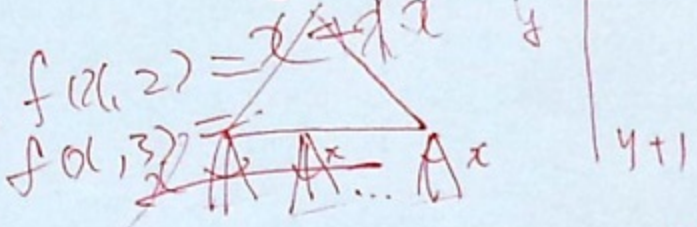
$f \circ g = f(g)$

primitive recursion

$f(x, 0) = g(x)$

$f(x, S(y)) = h(x, y, f(x, y))$

$f(x, 0) = x + x^2$



$f(x, y) = x \cdot y$  height  $\rightarrow y$

$f(x, 0) = x$

$f(x, y+1) = f(x, y) + f(x, y) \cdot x$

$x + x^2 + (x + x^2)x$

$= x + x^2 + x^3 + x^4 = \frac{x^5 - 1}{x - 1}$

~~$f(x, y) = x^y$~~   ~~$f(x, y+1) = x^{y+1}$~~

