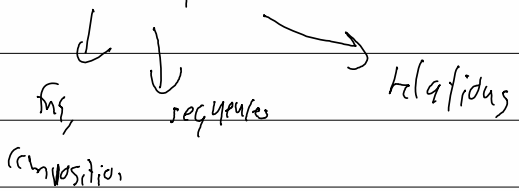
Oh W 12 PM
Th 4 PM
] or appointment

or just email me questions

Exam next Tuesday 8am

10, 11, 15



10.

$X = \{-1, 0, a\}$

$Y = \{\alpha, \beta, \gamma\}$

$f : X \longrightarrow X$

$f = \{(-1, \alpha), (0, \alpha), (a, \beta)\}$

$(-1, a) \in f \iff f(-1) = a$

$g : Y \longrightarrow X$

$g = \{(\alpha, -1), (\beta, 0), (\gamma, a)\}$

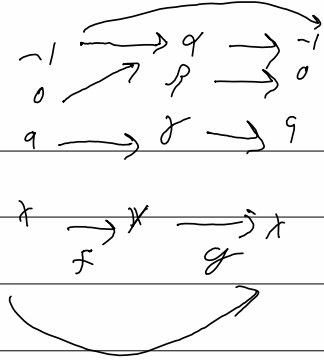
$g \circ f : X \longrightarrow X$

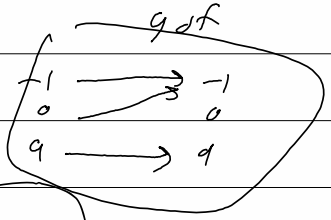
$(g \circ f)(x) = g(f(x))$

$(x, g(f(x))) \in g \circ f$

$f \circ g : Y \longrightarrow Y$

$(f \circ g)(\gamma) = f(g(\gamma))$



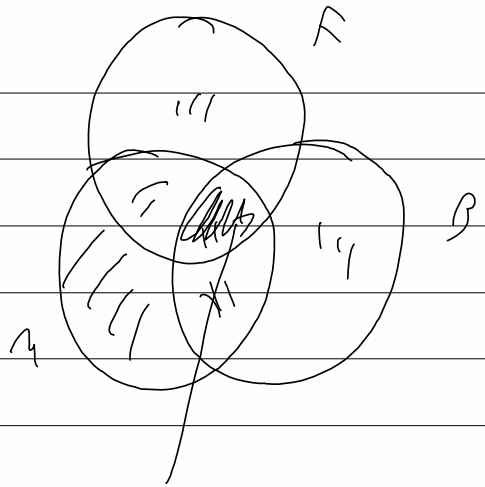


$g \circ f = \{(-1, -1), (0, -1), (a, a)\}$

$f(-1) = \alpha$ $\quad g(\alpha) = -1$

$f(0) = \alpha$ $\quad g(\alpha) = -1$

$f(a) = \beta$ $\quad g(\beta) = a$


A
B
C

11. $t_n = 2^n$, $n \geq 1$

a) $\sum_{i=1}^{3} t_i = t_1 + t_2 + t_3$

$= 2^1 + 2^2 + 2^3$

$= 14$

b) $\sum_{i=3}^{7} t_i = t_3 + t_4 + t_5 + t_6 + t_7$

$= 2^3 + 2^4 + 2^5 + 2^6 + 2^7$

$\sum_{i=a}^{6} t_i = t_a + t_{a+1} + \dots + t_6$

c) $\prod_{i=1}^{3} t_i = t_1 \cdot t_2 \cdot t_3$

$= 2^1 \cdot 2^2 \cdot 2^3$

$= 2 \cdot 4 \cdot 8$

$= 64$

d) $\prod_{i=3}^{6} t_i = t_3 t_4 t_5 t_6 = 2^3 2^4 2^5 2^6$

e) find a formula for the nth term where lower index is 0

$t_n = 2^n$, $n \geq 1$

$n=1 \rightarrow 2, 4, 8, 16, 32, 64, \ldots$ $\quad n \geq 1$

$S_n =$ $\quad n \geq 0$ $\quad n \leq 7$

$2, 4, 6, 8, 16, 32, 64, 128$

t	1	2	3	4	5	6
	2,	4,	8,	16,	32,	64
S	0,	1,	2,	3,	4,	5

$S_n = t_{n+1}$; $n \geq 0$

$= 2^{n+1}$

f→i) $t_n = 2^n$

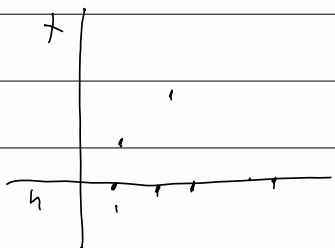
$n \leq m$ $\quad t_n \geq t_m$

$n < m$, $t_n < t_m$

$n < m$ $\quad 2^n < 2^m$

$f(x) = 2^x$

$f'(x) = \ln(2)\, 2^x > 0$



$n < m \Rightarrow 2^n < 2^m$

$2^n < 2^m \iff 2^{m-n} > 1$

$m > n \iff m - n \geq 1$

$k = m - n$

$2^k > 1$ if $k \geq 1$

$k = 1, \quad 2 > 1$

Def. q_i increasing (strict)

$i < j \Rightarrow q_i < q_j$

decr (strict)

$i < j \Rightarrow q_j < q_i$

q_i non-increasing ~~$q_1 = 5, \quad q_2 = 17$~~

$i < j \Rightarrow \text{NOT}(q_i < q_j)$

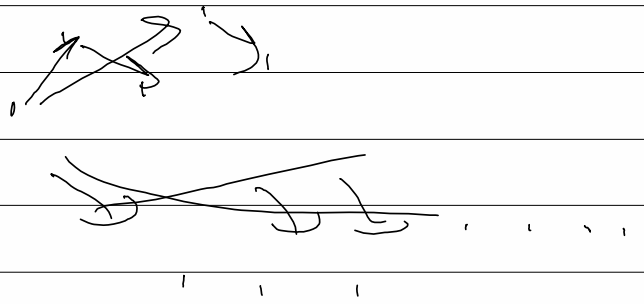
$\| \quad q_j \geq q_j$

somewhere incr, never increases

non-incr, $i < j \Rightarrow a_i \geq a_j$

// non-strictly decr //

non-decr



$q_1 = a_2$ non-decr,

not increasing

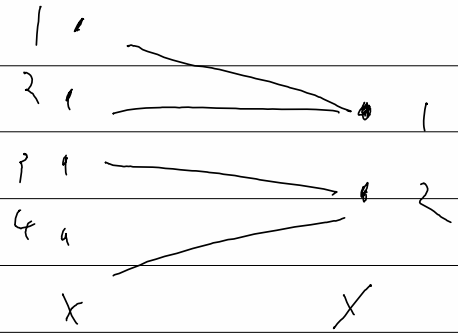
not non increasing

NOT (increasing)

Exist $i < j$ s.t. $q_i \geq q_j$

non incr for all $i < j$, $q_i \geq q_j$

Onto functions



for all y there is x s.t. $f(x)=y$

$$(ba)^2 = baba$$

$$ba^2 = baa$$