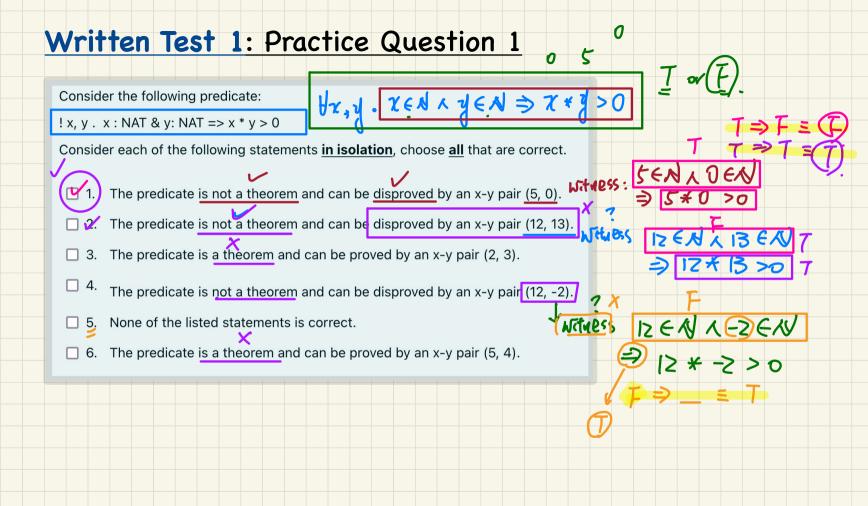
Review Q & A - Oct. 20

Written Test 1

Practice Test Questions
Math Review Lecture



Written Test 1: Practice Question 2 7x,y. XEN A yEN A X * y > 0 Consider the following predicate: #x, y . x : NAT & y: NAT & x * y > 0 Consider each of the following statements in isolation, choose all that are correct. \square 1. The predicate is not a theorem and can be disproved by an x-y pair (5, 0). \square 2. The predicate is not a theorem and can be disproved by an x-y pair (12, -2). -2 EN 1 -3 EN 3. None of the listed statements is correct. ☐ 4. The predicate is a theorem and can be proved by an x-y pair (-2, -3). 5. The predicate is a theorem and can be proved by an x-y par (5, 4). > 5 ENA 4 ENA F * 4 > 0 T 6. The predicate is a theorem and can be proved by an x-y pair (2, 3). \square 7. The predicate is not a theorem and can be disproved by an x-y pair (12, 13). 5 EN 10 OEN 15 * 0 > 0 this witness evaluates

prece dence

Given two sets S and T, say we write:

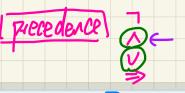
fa, b, c, d3 \ fa, e3 U fa.f3

- S \ T for their union
- S ∧ T for their intersection
- S\T for their difference

What is the **cardinality** of the power set of ({a, b, c, d}) \ {a, e}) \ {a, f}? Inter an integer value (with no spaces).

Answer: 37

$$\mathbb{P}((\{\underline{a},b,c,d3\},\{\underline{a},\underline{e3}\})\cup\{\underline{a},43\}) \\
 \{b,c,d3\cup\{\underline{a},43\}\} \\
 \mathbb{P}(\{\underline{a},b,c,d3\cup\{\underline{a},43\}\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3)) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3\}) \\
 \mathbb{P}(\{\underline{a},b,c,d3$$



Consider the following logical quantification:

!x,y.x:NAT&y:NAT=>x+y>=10&x+y<20

 $\exists x \cdot R(x) \Rightarrow R(x)$ $\equiv \exists \exists x \cdot R(x) \land \neg R(x)$

Convert the above predicate to an equivalent one using the other logical quantifier.

Note the following constraints on your answer:

- Only put pairs of parentheses when necessary.
- Like the above predicate, there should be **no** white spaces.
- Like the above predicate, numerical constants (i.e., 10, 20) must appear as the right operands of the relational expressions (e.g., x + y >= 10).
- Relational expressions should be simplified whenever possible, e.g., write $x \ge 20$ rather than not(x < 20).

Be cautious about the spellings: this guestion will be graded **automatically** and no partial marks will be give to spelling mistakes.

Answer:

not (# x,y. X: NAT & y: NAT & (x+y<10 or x+y>=20)

7+4 >= not (7+4 < 20

Consider two sets:

•
$$S = \{x, y\}$$

• $T = \{1, 2, 3\}$

SXT

reset of all possible relations
the set of all possible relations
between S and T.

Write out the $\frac{\text{maximum}}{\text{relation r such that }}$ r: S <-> T.

Requirements. In your answer:

- Pairs must be <u>sorted</u> in an <u>ascending</u> order by the first elements, or by the second elements if the first elements are identical. For examples: (x, 2) appears before (y, 1), (x, 1) appears before (x, 2), etc.
 - No white spaces should be included, e.g., write (x,1) rather than (x, 1).

Be cautious about the spellings: this question will be graded <u>automatically</u> and so no partial marks will be given due to spelling mistakes.

Answer:

 $\{(\chi,1),(\chi,2),(\chi,3),(\chi,1),(\chi,2),(\chi,3)\}$

Consider two sets:

• $S = \{x, y\}$

• T = {1, 2, 3}

Enumerate the following set:

{(a,b) | a : S & b : T & a /= x & b < 3}

Requirements. In your answer:

- 0. $\{(a,b)\}_{a\in S}$ be $a=x^{3}$ $3=x^{3}$ range $a\in S$ $b\in T$ $a\in S$ $b\in T$ $a\in S$ $b\in T$ $a\in S$
 - ements, or by the second elements if the first elements are in
- Pairs must be <u>sorted</u> in an <u>ascending</u> order by the first elements, or by the second elements if the first elements are identical. For examples: (x, 2) appears before (y, 1), (x, 1) appears before (x, 2), etc.
- No white spaces should be included, e.g., write (x,1) rather than (x, 1).

Be cautious about the spellings: this question will be graded <u>automatically</u> and so no partial marks will be given due to spelling mistakes.

Answer: $\{(1,1),(1,2)\}$

property: $0 \ a \neq x \lor b < 3 \ 3 \neg (a \neq x \lor b < 3)$ (Treatises) $0 \ a \neq x \Rightarrow b < 3$

V	Vritten Test	1: Practice	Question	7 (n)	Given M	elements,
	Consider two sets:				DOM WIP M	MAKP SYBSETS
	S = {x, y}T = {1, 2, 3}	<1 dom. ves.			of STEP W	17
	Consider r such that r : S <-> T:	< dom. res.				
	{(x, 1), (x, 3), (y, 1), (y, 2)} What is the result of the following	expression:	r = 5 (7	,1), [(7,3	(1 1)	(4)
	{x](<<)(r(>)(T \ {2}))	you. yes.	· LICIC	5713 (513)	713/2/3/2	, 10,13,1
	Requirements. In your answer: • Pairs must be sorted in an a	ascending order by the first e	lements, or by the second ϵ	elements if the first ele	ements are identical.	For
		fore (y, 1), (x, 1) appears before	re (x, 2), etc.			
	Be cautious about the spellings: t	, , , , , , , , , , , , , , , , , , , ,	tomatically and so no parti	ial marks will be giver	n due to spelling mista	akes.
	Answer:					
	{x}	Or D(T)	{23) 33 { @,	⟨, @ X	{(y,1)}	

e.g. | £s | se
$$\mathbb{R}(\{1,2,3,4,5,6\}) \wedge (1s|=30)|s|=5)$$
 | Compute: $\mathbb{R}(\{1,2,3,4,5,6\}) \wedge (1s|=30)|s|=5)$ | (b) + (b) \wedge subset of size 0 | \wedge | \wedge