Homework 1.1.: Known: a = 2 is fine. Why is a prime? Suppose unt:

n=i.j. We have been told that a"-1 is prive, so if we show a"-1 is

composite me houre a contradiction.

$$v_{3.5} = (v_{5}-1) \cdot (v_{1}+v_{5}+1)$$

Honework 1.3.: $n = p_1^{e_1} \cdots p_r^{e_r}$ b unst divide a ei for all i.

Attempt:
$$N^{\frac{a}{5}} = p_1^{\frac{a}{b}} \dots p_r^{\frac{a}{b}} = P_1^{\frac{a}{b}} \dots p_j^{\frac{a}{b}}$$

suppose it is rational

not rational

Let
$$n^{\frac{5}{5}} = \frac{\times}{y}$$
, $x, y \in 7L$. Now: $n^{\infty} = (n^{\frac{5}{5}})^{\frac{5}{5}} = (\frac{\times}{y})^{\frac{5}{5}} = \frac{\times^{\frac{5}{5}}}{y^{\frac{5}{5}}}$

integer

y/x.

Does yb | $\times^{\frac{5}{5}}$? No!

If
$$n = p_i^{e_i} ... p_r^{e_r}$$
 and b divides a ei for all i, then $n^{\frac{2}{b}}$ is an integer.

Homework 1.4.:

- 1. All sets are finite.
- 2. One set is infinite countable.
- 3. More than one set is infinite countable.
- 1. Idea: A,B are finite then AxB is finite. |AxB|=|A|:1B|.

Scale this to A1 x ... x An by induction.

2. Idea: A finite and B countable, then AxB is in hijection with B.

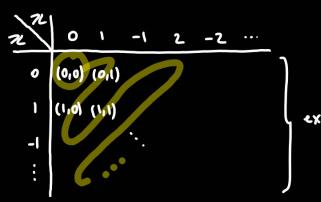
Remark: The sequent (0,1) is not countable.

- 1. O. anazars ... construct o. L. bz bz ... where bi + aii Vi.
- 2. 0. azi azz azz ...
- 3. 0. azı azz azz...

Now O. L, b2 b2... is in (0,1) but it is not on the list.

3. Idea: |72 x 22 | = |721. Scale this by induction.

Note: 14×B1=1A1·1B1 is only time for 1A1 and 1B1 finite.



exactly the elements of 72×72.

<u>Definition</u>: Two sets have the same cardinality if there is a bijection between them.

Homework 1.5.:
$$x_s \longrightarrow y_s$$

$$x_s \longrightarrow \frac{x - x_{min}}{x_{max} - x_{min}} \cdot (y_{max} - y_{min}) + y_{min}$$

Suppose it is time for u, prove uti.

$$p_{n} \cdot 2^{2^{n}} \in 2^{2^{n+1}}$$
 $\longrightarrow p_{n} \in 2^{2^{n+1}} \cdot \frac{1}{2^{2^{n}}} = 2^{2^{n+1}} \cdot 2^{n} = 2^{2^{n}}$

We Kums:

$$p_{n+1} \leq p_n^{n} + 1 \leq 2^{n} \cdot 2^{n} + 1 = 2^{n \cdot 2^{n}} + 1 \leq 2^{2^{n+1}}$$

n = 2" and more.