1(a) 1(-100,100) = 1(0,50)] Let X=

AFSOC that L is regular. This means there's a pumping length 17/1.

Consider a string cartist, SEL. From this we know that

1. I can be split into S=xyz

2. |xy| \le 1

3. xy = 6 L2, 120 4. xy = 17 Castel, xy = 10 Ca3j+1 t j+1, j x / 3 (

 $5. y = ca^{3k+1} t^{k+1}$ 

If we pump strong 0 time string & will be S=x7= Ca +1 that x7 & L. this contradict. Therefore 1 is not regular.

|(0)| = |(0,50)|The Assorber 15 to 100, 50)|

The Assorber 15 to 100, 50;

Let  $Y = (\frac{100}{100}, \frac{100}{100}, \frac{100}$ 

First let prove that a fraction is large chie.

We need to show that & si, y & x if (fix) = fiy)) -> (x=y)

We can take any orbitary to show that x, y & x. Let clopse 1,

\*\* |x| = | y | and that f is injective.

So, the  $|X| \le |Y|$ .

Dec prove that Second we need to prove that f is surjective. We need to show that  $\exists x \in X$  and  $\forall y \in Y$ ; f(x) = y.

Let assume  $y \in Y$ . If  $x \in X$  then  $x = \frac{y}{2}$ . This news  $f(x) = \frac{1}{2} \cdot \frac{1}$ 

(b) \* You can find a Sije (non between (0,1) and (114,314) c[-1,1].

Hence | (0,1) | \le | ([-1,1]) .

You can also find a bijection between (114,5) on 4) c(6,1)

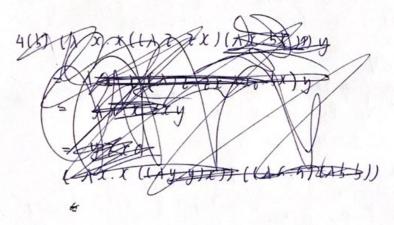
and [0-1,1].

Hence to | (T-1,1] | \le [0,1]

So , | (0,1) | = | \tau - 1,1] |,

- (6) False, Only the language that is turing recognitible is countrible.
  (6) False, A regular "language is Finite if it is not regular then its not.
  - (1) True Felse, it can have more than I accepting state.

  - False, it the same
  - (e) True, According to the Definition, if the language is regular if + Here is word if we can construct a DED. Then we can construct a Just's mechane that istimulate that DEA
  - (f) True lattile it is decidable means a language is regular, so it is conte. (g) False, st depends on what a muchine is program for.
    - (h) True
    - (1) False



4 (b) (xxx ((x = . +x) (xx. 5x ) ))y

= XXXXXXY

= 477

(xx.x((1xy.y)x))((16.9)(x5.5))

= XX. X (Ay. yx) (A9.616.6)

= 19.916.5 (14.9(16.9 16.5))

= Ab. b (19.9 (15.415.5))

= 24.9 (16.916.6)

2,16.613.6

= 1b.b

4 (4) (AX XY) (X A Y YE) (A'Y 2: 24)

1 = free versile

1 (AY YEXDY) (AX2. (AY EDITIVE)

1 = free versile

1 (ABBOR ALIXEY

Free ILITAE ()