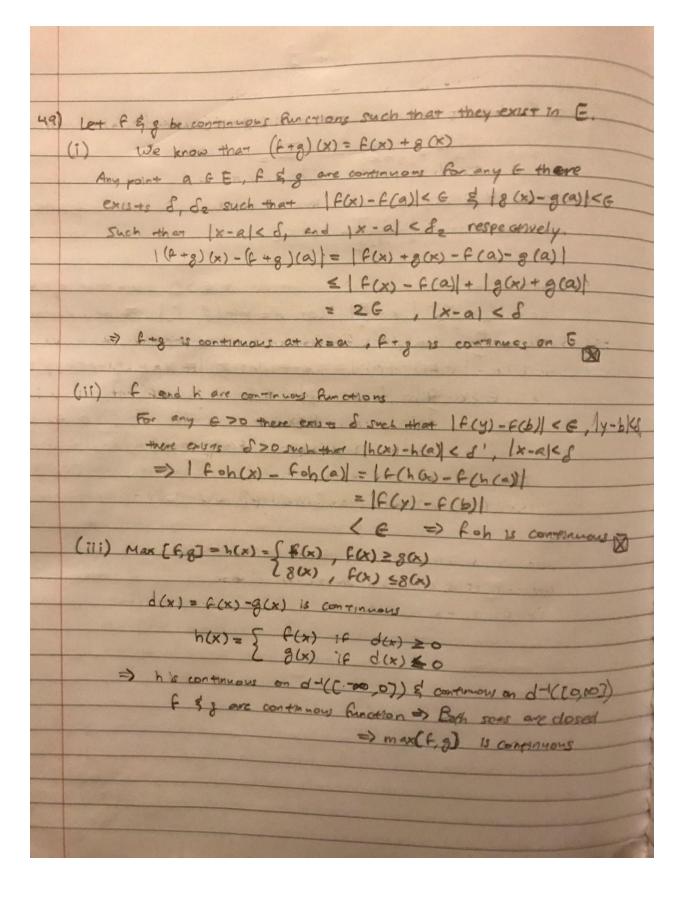
=>  $\forall \in >0$ ,  $\exists$  an M that has a large value where q > Mso that  $\left| \frac{sm}{q} - 1 \right| \le \varepsilon$ 

Let x be an irransonal number for  $\forall \in >0$  such that  $\delta_1 = \epsilon$  and  $\delta_2 = \min_{x \in \mathbb{N}} |x - \frac{\epsilon}{2}|$ . Let  $\delta = \min_{x \in \mathbb{N}} |\delta_1, \delta_2|$ . For any rational  $y = \frac{\epsilon}{2}$  with  $|x - y| < \delta_1, 1 + \text{ follows}$  that  $|f(x) - f(y)| = |x - p(\sin(\frac{1}{2}))| = x - p + \frac{\epsilon}{2} - p\sin(\frac{1}{2}) \leq \frac{1}{2}$ 

1x-2 + 12- psin 2 | < 26.

For  $\forall x \in [0,1]$ , and  $\forall \in 70$  such that  $\delta = \varepsilon > 0$  for any irrational y with  $|x-y| < \delta \Rightarrow |f(x)-f(y)| = |x-y| < \varepsilon$ From this, we can conclude f(x) is continuous on [0,1] $\Rightarrow$  this is true for [N,N+1] where N is an integer [0,1]



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(iv) Les f be a real continuous function.
- Continuous function.
For any point a GE, IF(x)-F(a) SIF(x)-F(a)
< G-
=> IFI & commun, Qx=a
=> I FI is continuous on E
the region of the residence of the second second second
and are a few for the president of
Sind ( ) a line of the seal of T. 3 a positive real number to
such that   f(x,) - f(x2)  & k   x1 - x2   for all x, x2 & I.
That   P(x,)

Since fix a Lipschmiz function on I, I a positive real number k

Such that | F(x,) - F(x\_2)| & k | x\_1 - x\_2| for all x\_1, x\_2 & I.

Let & > 0, then for all points x\_1, x\_2 & I such that | x\_1 - x\_2| & \frac{1}{2} \\

\Rightarrow | F(x\_1) - F(x\_2)| < k \cdot \frac{1}{2} \\

\Rightarrow | F(x\_1) - F(x\_2)| < k \cdot \frac{1}{2} = \frac{1}{2} \\

\Rightarrow | F(x\_1) - F(x\_2)| < \frac{1}{2} \\

\Rightarrow | F(x\_1) - F(x\_2)| \\

\Right