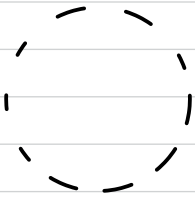
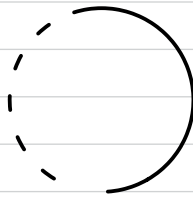


## Absolute Maxima and Minima

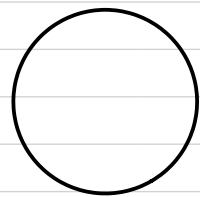
A set is closed if it contains all of its boundary pts.



no

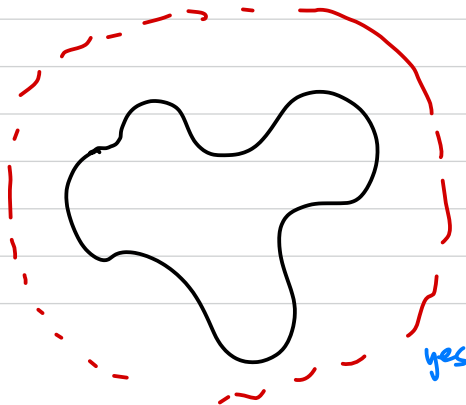


no

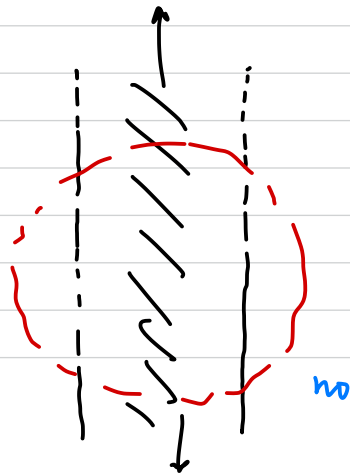


yes

A set is bounded if it can be contained inside some circular disk.



yes



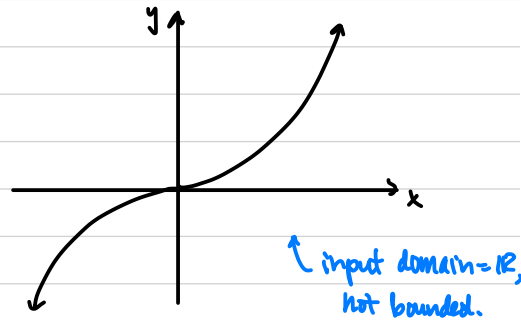
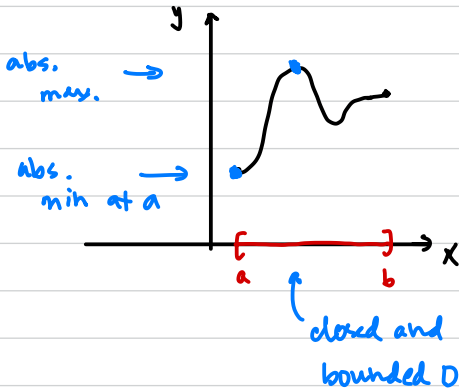
no

↳ About abs max/min

Thm (Extreme Value Theorem) If  $f$  is cts on a closed and bounded set  $D \subset \mathbb{R}^n$ , then  $f$  achieves an absolute maximum and an absolute minimum at some points in  $D$ .

↳ topology

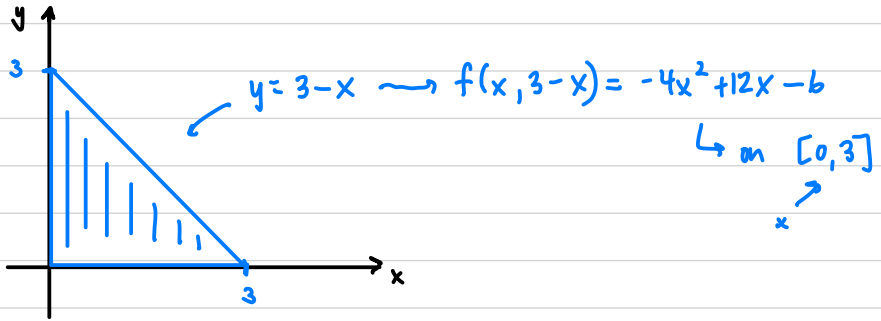
Recall this for  $f: \mathbb{R} \rightarrow \mathbb{R}$ :



Ex Find abs. max/min of

$$f(x,y) = 4x + 4y - 2x^2 - 2y^2$$

on triangle:



Strategy:

restrict attention  
to those in triangle.

- candidate pts. {
1. Find all critical pts  $\bar{a}$  where  $Df(\bar{a}) = (0 \dots 0)$   
or  $Df(\bar{a})$  undefined
  2. Find pts on boundary where max's or min's could occur.
  3. Test values of  $f$  at all candidate pts.

$\hookrightarrow$  biggest = abs. max

smallest = abs. min.