

Unit 0. Course Overview, Homework

Course > 0, Project 0 (1 week)

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# 3. Function Properties

## **Asymptotics and Trends**

4.0/4.0 points (graded)

For each of the following functions f(x) below:

- ullet Find its limits  $\lim_{x o\pm\infty}f\left(x
  ight)$  as x approachs  $\pm\infty$ .
- ullet Choose the values of x where  $f\left( x
  ight)$  is differentiable, i.e.  $f^{\prime}\left( x
  ight)$  exists
- ullet Choose the values of x where  $f\left( x
  ight)$  is also strictly increasing, i.e.  $f^{\prime}\left( x
  ight) >0.$

1. For 
$$f(x) = \max(0, x)$$
:

(If the limit diverges to infty, enter  $\inf$  for  $\infty$ , and  $\inf$  for  $-\infty$  )

$$\lim_{x o +\infty} f(x) =$$
 inf inf inf

Choose the intervals of x where

$$f\left( x
ight)$$
 differentiable:  $f^{\prime}\left( x
ight) >0$  :

(Choose all that apply.)



(Graph this function on a piece of paper!)

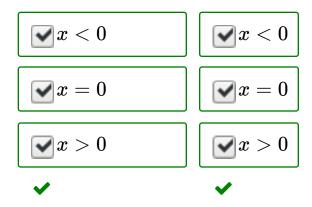
2. For 
$$f\left(x
ight)=rac{1}{1+e^{-x}}$$
 :

(Enter **inf** for  $\infty$  and similarly **-inf** for  $-\infty$  if the limit diverges to infty.)

Choose the intervals of x where

$$f\left( x
ight)$$
 differentiable:  $f^{\prime}\left( x
ight) >0$  :

(Choose all that apply.)



(Graph this function on a piece of paper!)

#### **Solution:**

See answers above.

**Remark:** The function  $f(x) = \max(0, x)$  is also called the a **linear rectifier** and the **Sigmoid** function, and will be revisited in *Unit 3 Neural networks* as activation functions within neural networks.

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You have used 1 of 3 attempts

**1** Answers are displayed within the problem

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| Staff] Please check the answer to 2nd part of problem 2.

9

cant submit my third attempted answers the SUBMIT button isn't working cant submit my third attempted answers the SUBMIT button isn't working	5
I can't click the submit button The submit button is unavailable but I only tried once and cannot submit anymore	2
[TA] What is the difference between the Choice "X>0" and "X>0"?  [TA] What is the difference between the Choice "X>0" and "X>0"?	3
<u>BUG ? Question 1 part 2</u> <u>During part 2 of question 1 where I must indicate the interval of x. I chose the right column o</u>	3
Problem 2 <u>I used 1 out of 3 submissions when there was the bug, and it wouldn't let me resubmit.</u>	9
Unable to submit answers Good afternoon - My "Submit" button is inactive, although I've yet to use any of my three atte	6
differentiable and strictly increasing  A function which is differentiable and strictly increasing is not necessarily has positive derivat	3
please do a quality check of the questions and answers is it me or is this course off to a aswful start? Please some effort into testing and proofreadin	. 12
<ul> <li>Clarifications on the question.</li> <li>1. So, is F(x) undefined at x = 0? also in the second part for the same question You want us to</li> </ul>	. 2
Question 1 Derivate  I got first question right but I am not sure the answer is correct, are there going to be answer	2

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