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**Lecture**Lecture questions due Oct 18,  
2016 at 19:30 IST**Recitation****Problem Set 6**Homework 6 due Oct 18, 2016 at  
19:30 IST

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## Problem 4

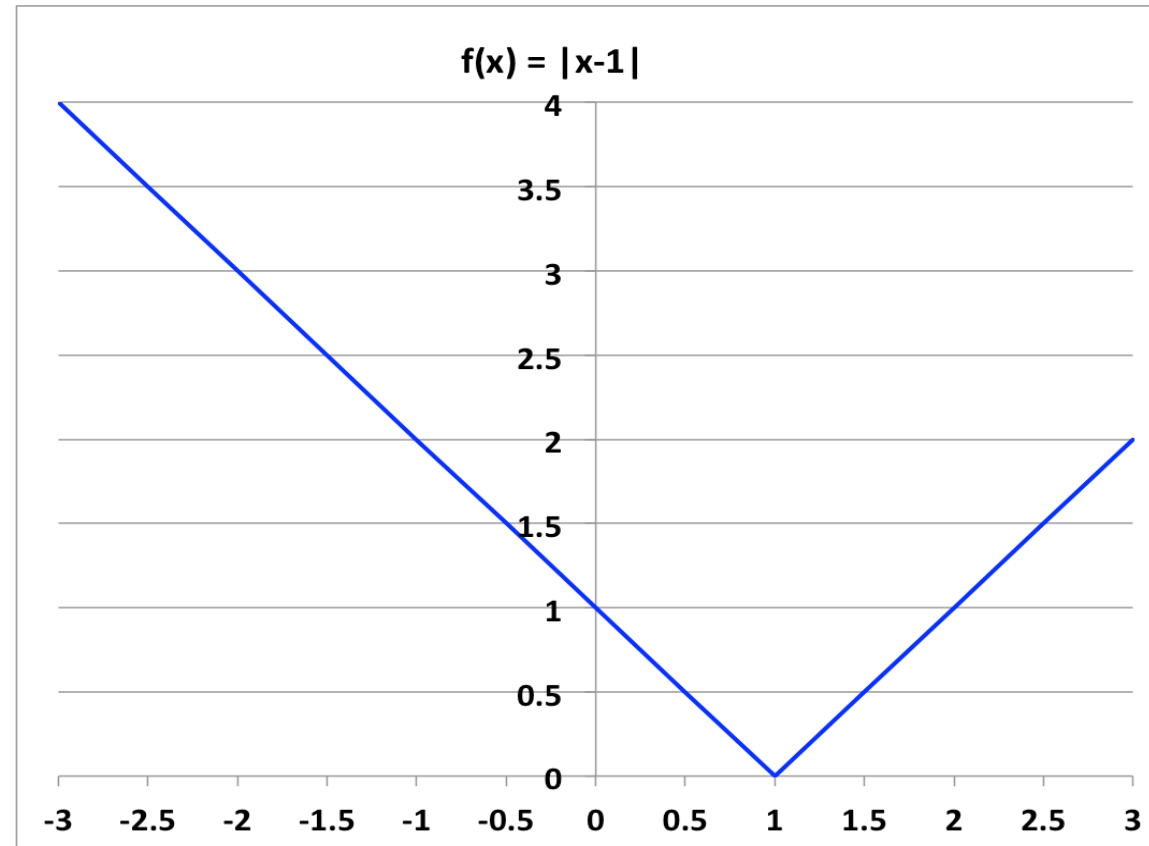
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### PART A

0 points possible (ungraded)

For each part, determine whether the function is convex or not over its domain.

► Exit Survey



$f(x) = |x - 1|$  for  $-3 \leq x \leq 3$ .

☐ Not Convex

☒ Convex ✓

EXPLANATION

**Solution**

$f(x)$  is convex.

Submit

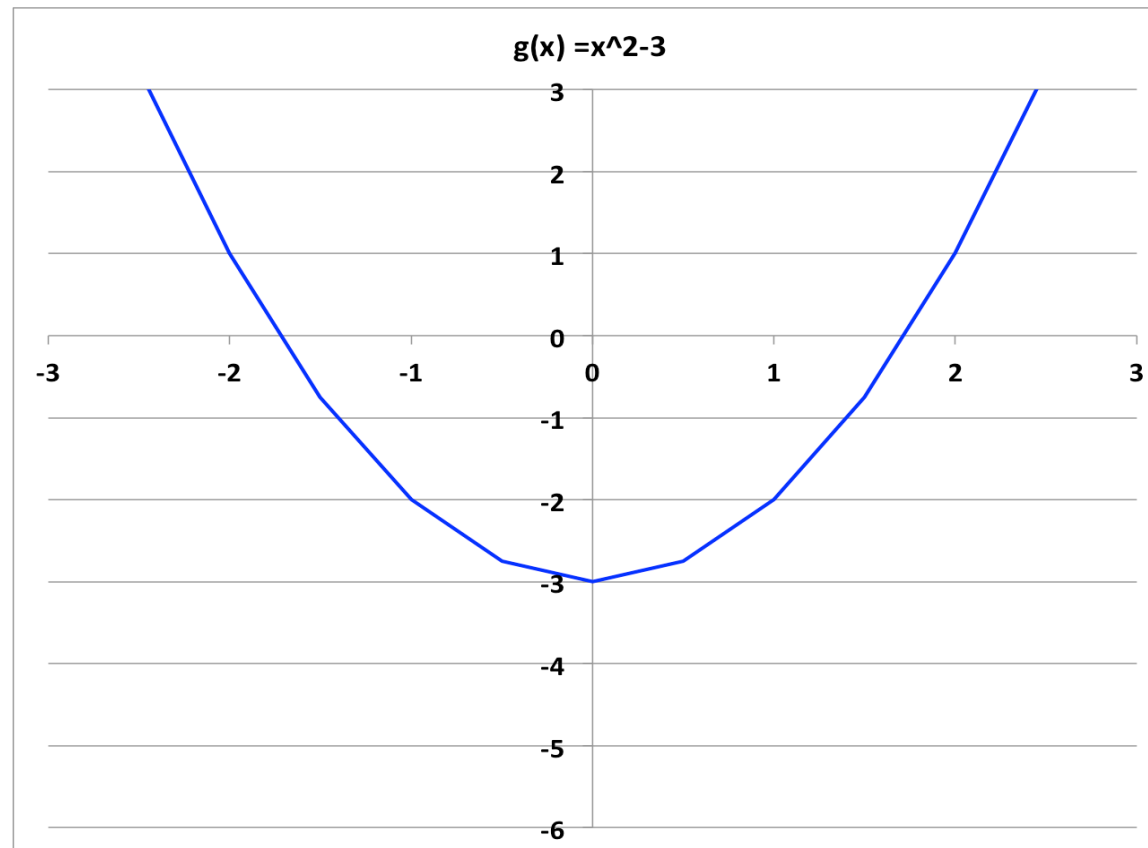
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✓ Correct

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**PART B**

0 points possible (ungraded)



$g(x) = x^2 - 3$  for  $-3 \leq x \leq 3$ .

☐ Not Convex

☒ Convex ✓

EXPLANATION

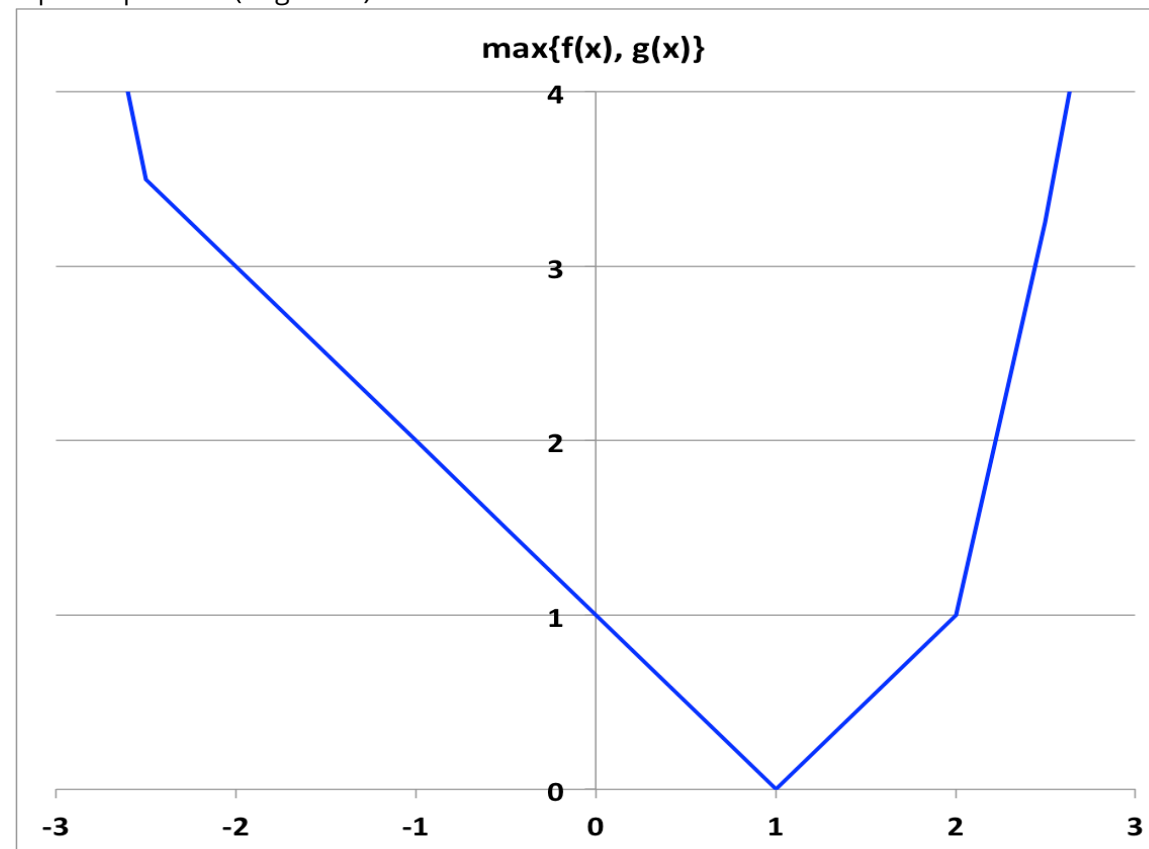
**Solution:**  $g(x)$  is convex.

Submit

✓ Correct

### PART C

0 points possible (ungraded)



$$h(x) = \max\{|x - 1|, x^2 - 3\} \text{ for } -3 \leq x \leq 3.$$

☐ Not Convex

☒ Convex ✓

### EXPLANATION

**Solution:** The function  $h(x)$  is convex.

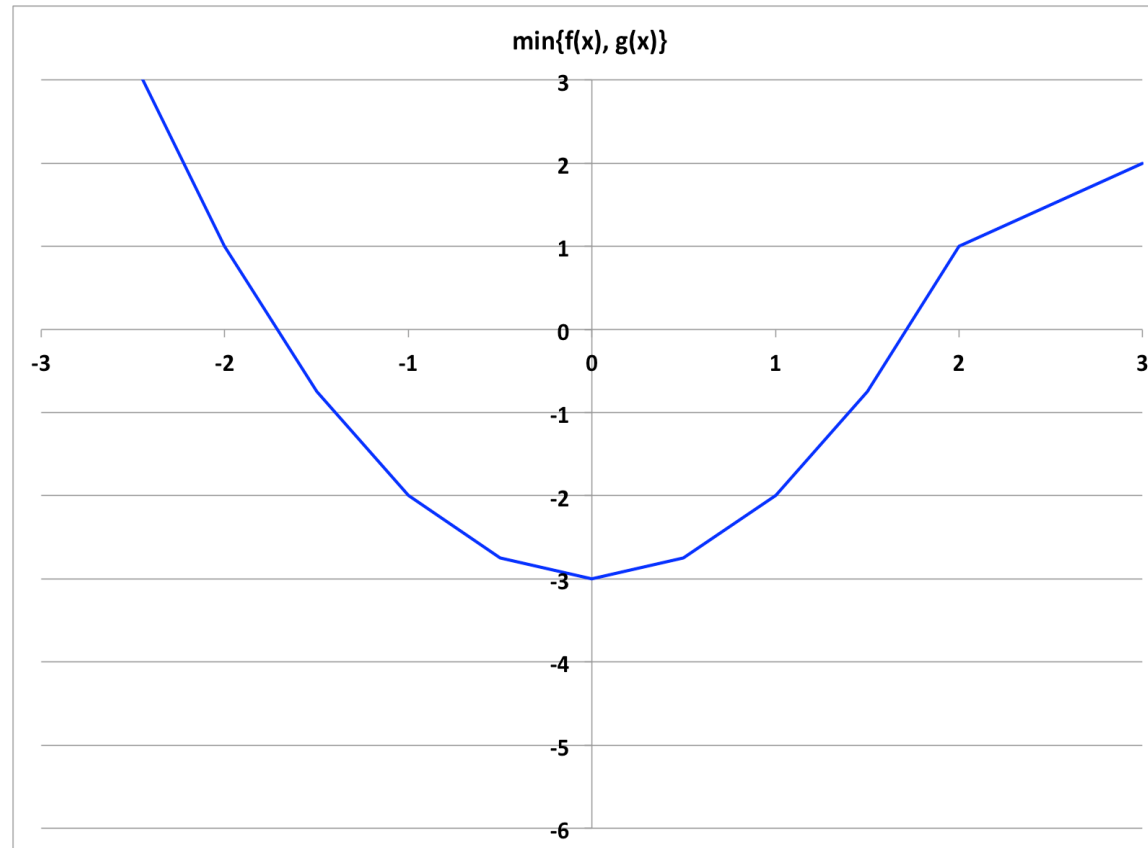
In general, the maximum of two convex functions is convex.

Submit

✓ Correct

### PART D

0 points possible (ungraded)



$$h(x) = \min\{|x - 1|, x^2 - 3\} \text{ for } -3 \leq x \leq 3.$$

☐ Convex

☒ Not Convex ✓

EXPLANATION

**Solution** The function  $h(x)$  is not convex.  
The minimum of convex functions is not necessarily convex.

Submit

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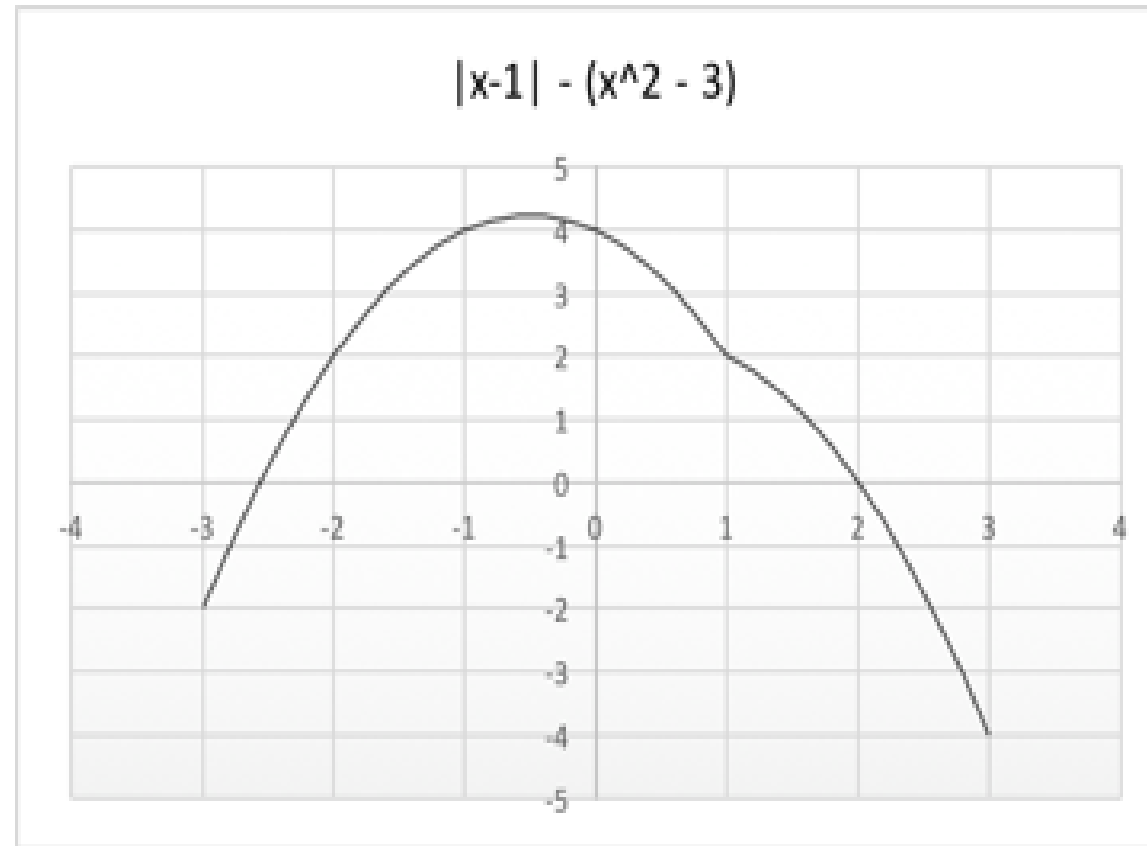
✓ Correct

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## PART E

0 points possible (ungraded)





$h(x) = |x - 1| - (x^2 - 3)$  for  $-3 \leq x \leq 3$ .

☒ Not Convex ✓

☐ Convex

EXPLANATION

**Solution:** The function  $h(x)$  is not convex. The difference of two convex functions is not necessarily convex.

Submit

✓ Correct

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