

# Lecture 17 Activity: Mean Value Theorem and the Shape of Graphs

Originally Written by Nadia Lafrenière and Bosu Choi  
Updated by Ben Logsdon  
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math.dartmouth.edu/~blogsdon/activity17.pdf

1. Sketch the graphs of the following functions:

1.1  $f(x) = (x - 2)(x - 1)^2$

1.2  $g(x) = \frac{x+1}{(x-2)^2}$

2. For each of the following two sets of conditions, sketch the graph of a function that satisfies all of the given conditions:

2.1  $f'(0) = f'(2) = f'(4) = 0,$

$f'(x) > 0$  if  $x < 0$  or  $2 < x < 4,$

$f'(x) < 0$  if  $0 < x < 2$  or  $x > 4,$

$f''(x) > 0$  if  $1 < x < 3,$

$f''(x) < 0$  if  $x < 1$  or  $x > 3$

2.2  $f''(x) < 0$  and  $f''(x) > 0$  for all  $x.$

3. Suppose you drive for 0.5 hours, covering a distance of 35 miles. Is there any time during this drive when your speed has exceeded 65 mph? Why?