

Team name:

Names of members who were present and contributed to the discussion:

A piece of cardboard that is  $6 \times 6$  (each measured in inches) is being made into a box without a top. To do so, squares are cut from each corner of the box and the remaining sides are folded up (as we did on Thursday). **Suppose the box *has to be at least 1 inch deep and no more than 2 inches deep*.**

For each question, circle one or more correct answers.

- There is a maximum possible volume of the box.  
True                      False
- There is a minimum possible volume of the box.  
True                      False
- If the maximum possible volume of the box exists, what is the maximum possible volume?
  - There is no maximum possible volume. The volume of the box can be made to be as large as you want.
  - 0
  - 8
  - 25
  - The maximum possible volume lies in the interval  $(0, 8)$ .
  - The maximum possible volume lies in the interval  $(8, 25)$ .
- If the minimum possible volume of the box exists, what is the minimum possible volume?
  - There is no minimum possible volume. The box can be made to be as small as you want.
  - 0
  - 8
  - 25
  - The minimum possible volume lies in the interval  $(0, 8)$ .
- Make a sketch of the cardboard paper with the corners cut out. Choose a variable name (let's say,  $x$ ) to represent the size of the length of the square that has been cut out, and put it into your sketch in the appropriate places. Write down a function using this variable (let's say,  $x$ ) which gives a formula for the volume of the box.  
Circle all choices below which are equal to your function.
 

$4x^3 - 24x^2 + 36x$	$x(2x - 6)^2$	$-4x(6 - 2x) + (6 - 2x)^2$
$(6 - 2x)(-6x + 6)$	$-(6 - 2x)(6x + 6)$	
- Compute the derivative of this function.  
You are NOT allowed to use a computing device to compute this.  
Circle all choices below which are equal to the derivative.
 

$4x^3 - 24x^2 + 36x$	$x(2x - 6)^2$	$-4x(6 - 2x) + (6 - 2x)^2$
$(6 - 2x)(-6x + 6)$	$-(6 - 2x)(6x + 6)$	
- What are the critical numbers of your function from part (5)?  
Circle all possible choices below
 

-6	-3	-2	-1	0	$\frac{1}{3}$	1	$\frac{3}{2}$	2	3	6
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