

Team name:

Answer Key

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

A piece of cardboard that is 6×6 (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.

1. There is a maximum possible volume of the box.

True False

2. There is a minimum possible volume of the box.

True False

3. If the maximum possible volume of the box exists, what is the maximum possible volume? **16**

(a) There is no maximum possible volume. The volume of the box can be made to be as large as you want.

(b) 0

(c) 8

(d) 25

(e) The maximum possible volume lies in the interval $(0, 8)$.

(f) The maximum possible volume lies in the interval $(8, 25)$.

4. If the minimum possible volume of the box exists, what is the minimum possible volume?

(a) There is no minimum possible volume. The box can be made to be as small as you want.

(b) 0

(c) 8

(d) 25

(e) The minimum possible volume lies in the interval $(0, 8)$.

5. 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.

$4x^3 - 24x^2 + 36x$

$(6 - 2x)(-6x + 6)$

$x(2x - 6)^2$

$-(6 - 2x)(6x + 6)$

$-4x(6 - 2x) + (6 - 2x)^2$

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.

$4x^3 - 24x^2 + 36x$

$(6 - 2x)(-6x + 6)$

$x(2x - 6)^2$

$-(6 - 2x)(6x + 6)$

$-4x(6 - 2x) + (6 - 2x)^2$

7. 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