WORKSHEET #5
Math 6A30, Fall 2020

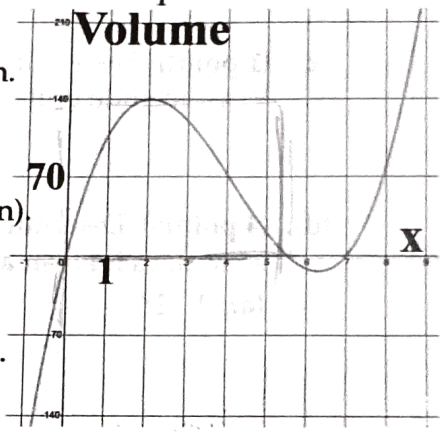
Name: Jaqueline Martinez **Group Name:** 1

Instructions. *You are encouraged to work with* **(not copy)** *your group, but each of you will turn in your own worksheet by the end of the day (11:59 pm) via Gradescope. You may ask the TA a few questions, which the TA will answer with leading questions (not answers) to help guide you.*

Log in to www.Gradescope.com with your UCRNetID@ucr.edu email to submit your worksheet.

Instructions for clear submissions. *If you can, write on the worksheet. If you cannot, then write your solutions to page 1 of the worksheet on one paper and your solutions to page 2 of the worksheet on a second paper. Clearly label each question.* **Scan** *your work with a scanning tool to* **pdf** *and upload it to Gradescope.* ***Your submission should be clear, easy to read, no shadows with each of your pages submitted to the correct page on Gradescope.*** *If it is not, then resubmit. Worksheet is* **15** *points (-2 for unclear submissions).*

Question 1 (7 points) An open box is made by cutting four equal-sized squares from the corners of a rectangular piece of cardboard and folding up the sides. This graph represents the volume of a box (in cubic inches) in terms of the side length, x in inches, of the cut out square.



(a). Use the graph to *approximate* this box's:

(1). (1 point) volume when cutout square has 1in side length.

105 inches^3

(2). (1 point) domain & range *in context* (use interval notation)

domain: [0, 5.5]

range: [0, 140]

(3). (1 point) side length(s), x, when the box volume is 70 in^3.

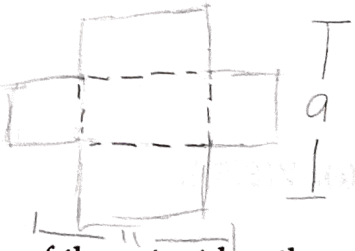
0.5 inches

(b). (1 point) Now assume the cardboard is 9in by 11in. Draw a diagram of the cardboard with sides removed. Label length, width, and height of this box once it is folded. Include x.

length: $9-2x$

width: $11-2x$

height: x



(c). (2 points) The volume of the box in (b), V, is a function of the cutout length, x. Write an equation for the function V in terms of x. *Use function notation.*

volume $(11-2x)(9-2x)x$

$V(x) = (11-2x)(9-2x)x$

(d). (1 point) Does the graph represent the equation from (c)? **Justify.**

The equation does represent the graph but to some extent. The graph is only from 0 to 5 in terms of the context. Everything else on the graph should be disregarded.

Question 2 (8 points) Two identical ice cubes are removed from the freezer and placed into separate empty cups on the counter. The ice cubes are originally perfect cubes with side length 3cm. To ice cube S, salt is added to the cup. To ice cube P, nothing is added to the cup. Every minute since being removed from the freezer, the side lengths of the ice cubes melt 0.2 cm for S and 0.1 cm for P. The side length of ice cube S is a function, S, of the number of minutes, t, since it was removed from the freezer. The side length of ice cube P is a function, P, of the number of minutes, t, since it was removed from the freezer.

(a). (1 point) Write an equation for the function S of t.

Side length 3 $S(t) = 3 - 0.2t$

Ice S:

(b). (2 points) When does $S(t) = 0$? What does this mean? Be specific and **include units**.
Tip: What fraction is the rate of change? This can help you simplify your answer by hand.

$S(t) = 0$ means that it takes 15 minutes for the ice to have completely melted.

$t = 15$ minutes

(c). (1 point) The volume of a cube is a function, V, of its side length, x. Write an equation for $V(x)$. Include units.

$V(x) = \frac{3}{0.2a}^2$

(d). (4 points) Determine if each of the following expressions make sense in context. If so, what does it **mean and equal** (include units)? If not, why not? Explain and be specific.

(a). $V(2)$. $= 56.25\ cm^3$

(b). $P(2)$. $= 0.2cm$ of the ice cube that has melted.

$P(t) = 0.1t$

(c). $V(S(5))$.

$S(5) = 1$

$V(2) = 56.25cm^3$ the volume of the

(d). $P(S(1))$. $= 0.28cm$ of the ice cube that has melted.

$P(2.8)$