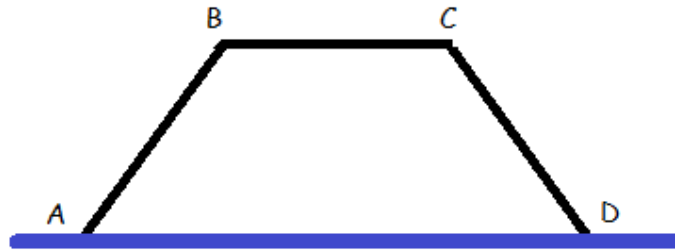


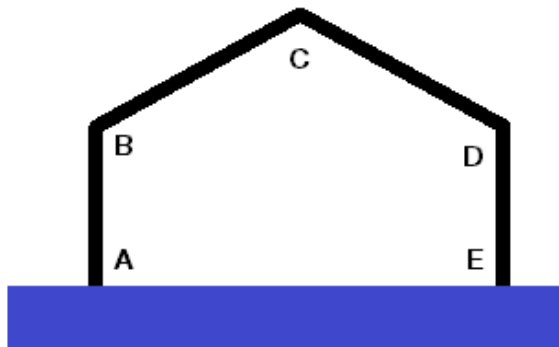
*This problem is worth 40 points. You may freely discuss this problem with any other student in MATH 131, but please keep written work and pictures of solutions to groups of no more than six. I expect, as always, that any work that you submit represents your mathematical understanding. Some of these problems may require techniques for taking derivatives that we don't yet have, or complex algebra to find their x -intercepts. You are **expected** to use Desmos to find critical numbers; please round to the nearest tenth.*

1. A farmer has 2400 feet of fencing, four poles, and a copy of Microsoft Paint. The farmer needs no fencing along the river. They show you the following diagram.



Assuming that AB , BC , and CD all have the same length, find the distance AD that gives a pen of maximum area, and find that maximum area.

2. The farmer buys a fifth pole and finds a font that isn't Comic Sans. They show you the following diagram.



- (a) Assuming that AB , BC , CD , and DE all have the same length, find the distance AE that gives a pen of maximum area, and find that maximum area.
- (b) Assuming that AB and DE are half as long as BC and CD , find the distance AE that gives a pen of maximum area, and find that maximum area.
- (c) Explain, as best you can, why the maximum areas you found in Problem 1 and Problem 2b are exactly the same.