Instructions: This assignment is open everything. Open book, open notes, open laptop, open conversation. Write your work for this problem directly on this sheet. You will be graded only on the work that you show.

Group Quiz 1.1. Find all solutions to the equation

$$\sqrt{x+3} - 1 = x. \qquad\qquad \text{(Equation A)}$$

Our group spent _____ *minutes on this, and I am* [not | somewhat | completely] *happy with my answer.*
Right now, this problem feels [not | somewhat | completely] *worth the time we spent on it.*

The problems on this side of the sheet are designed to provoke discussion and exploration. A lot of them won't have a single right answer; that's intentional. You may put any written work for them directly in your notebook; it will not be collected. **You are not expected to complete every problem.**

Exploration 1.2. Even though you won't be allowed to use a calculator during exams, using online resources to help you study is one of the most important skills in college mathematics.

(a) Check this out: `https://www.desmos.com/calculator/waj509g6s2`. (These links are clickable in the pdf version.) Then go back with your group to Problem 1.1.

(b) Click the circle next to the third function to graph it. What are you looking at? What does this have to do with extraneous solutions to Equation A? Have a discussion with your group about this.

Our group spent _____ minutes on this, and I am [not | somewhat | completely] happy with my answer. Right now, this problem feels [not | somewhat | completely] worth the time we spent on it.

Exploration 1.3.

(a) Use Desmos to find all solutions to the equation

$$\sqrt{x+3} = x. \hspace{2cm} \text{(Equation B)}$$

(b) Great! Unfortunately, that's not the *exact* answer, and WebAssign won't accept it as correct. Find the exact answer. (The quadratic formula is useful!)

Our group spent _____ minutes on this, and I am [not | somewhat | completely] happy with my answer. Right now, this problem feels [not | somewhat | completely] worth the time we spent on it.

Exploration 1.4. Now consider the general equation

$$\sqrt{x+3} = ax + b. \hspace{2cm} \text{(Equation C)}$$

(a) Equation B is a special case of this equation. What are the values of a and b?

(b) Equation A is a special case of this equation. What are the values of a and b?

(c) I conjecture the following: "an equation like this *never* has two solutions." Prove that I'm wrong. `https://www.desmos.com/calculator/7jacws7uth`

(d) (I think this one is harder than the rest.) There are values of a and b for which the solution set of the equation is "$x = -2$ or $x = 6$." Find them.

Our group spent _____ minutes on this, and I am [not | somewhat | completely] happy with my answer. Right now, this problem feels [not | somewhat | completely] worth the time we spent on it.