Checkpoint revisions

You will be given the opportunity to revise any problem for a standard you are still working on from a previous checkpoint. If you successfully revise the problem you will be able to attempt that standard when we do the next checkpoint. Revision involves two steps

1. Providing a correct solution to the problem.
2. Writing a reflection about what you were missing and why you are now ready to successfully pass the standard.

You will combine these two things and submit them to grade scope. If your revision is lacking in either of these two

Correct Solution

When you write up the correct solution you can use any resources you want. I am always happy to help you with this step.

Reflection

This is the more important step. What I am looking for here is a meaningful reflection on what you were not understanding and how you learned from whatever mistake you made. Things you probably want to include in your reflection are:

1. A description of the error you made that identifies the larger concepts you did not fully understand, not just the symptom;
2. A correct explanation of the concept you were missing. This is different than explaining the error you made in this specific problem;
3. Ideas about how to avoid such errors in the future or ways to learn that will help with future concepts you might similarly be confused by.

Let's look at an example of a problem, an incorrect solution, and two possible reflections.

Example

Problem: Find the length of the portion of the curve

$$\mathbf{r}(t) = \left\langle t^2, \frac{2}{3}(2t+1)^{3/2} \right\rangle,$$

where $t \geq 0$, that lies between the lines $x = 0$ and $x = 16$.

Incorrect solution: First we compute $|r'(t)|$ because we will need this.

$$\begin{aligned} |r'(t)| &= |\langle 2t, 2(2t+1)^{1/2} \rangle| \\ &= \sqrt{4t^2 + 4(2t+1)} \\ &= \sqrt{4t^2 + 8t + 4} \\ &= \sqrt{4(t+1)^2} \\ &= 2t + 2 \end{aligned}$$

Now to compute the arc length we use this formula

$$\begin{aligned} L &= \int_0^{16} |r'(t)|\, dt \\ &= \int_0^{16} 2t + 2\, dt \\ &= t^2 + 2t|_{t=0}^{t=16} \\ &= (16)^2 + 2(16) \\ &= 288 \end{aligned}$$

Error: The bounds should be from 0 to 4 because as t ranges from 0 to 4 the x-coordinate will range from 0 to 16.

Insufficient reflection: I did not have the right bounds. Next time I will study more. I will make sure to have the correct bounds when computing arc length.

Great reflection: The error I made has to do with the bound of integration when computing arc length. For this problem I saw that we wanted x to range from 0 to 16 so I put those as my bounds without thinking much about it. What I did not fully think through is that when we compute arc length we must parameterize the curve we are finding the length of and when we compute our integral we are doing it in terms of the t coordinate on this parameterization, not the x coordinate. This makes sense becuase we are subdividing our curve into little segments based on changes in time. We could parameterize the same curve in a different way and that would probably change the bounds on t even though x is ranging from 0 to 16. Whenever we think about an integral it is important what we are integrating with respect to (that's why it's important to write the dt!). Understanding this more fully I am going to try to think through the formulas I am using and try to avoid sticking numbers in without understanding why they belong. Another idea I have is to draw a sketch of the curve if I can and that might help me see if my answer is reasonable.