

MATH 2300 - Example to Show How to Write Up Homework

(Contributed by Cliff Bridges)

1. Approximate $\int_1^5 (2x^2 - 1)dx$ by a left hand sum with four rectangles of equal width.

Solution 1

$$n = 4, a = 1, b = 5, \Delta x = \frac{b-a}{n} = 1$$

$$LS_4 = \sum_{i=0}^{n-1} f(a + i\Delta x) = 2(1)^2 - 1 + 2(2)^2 - 1 + 2(3)^2 - 1 + 2(4)^2 - 1 = 1 + 7 + 17 + 31 = 56.$$

This is clearly very detailed work. When you first learned Riemann sums, you needed to see, and therefore show, all of this. However, by the exam your work may look like:

Solution 2

$$n = 4, \Delta x = 1, LS_4 = 2(1)^2 - 1 + 2(2)^2 - 1 + 2(3)^2 - 1 + 2(4)^2 - 1 = 56.$$

The above will also receive full credit. The following will not ever receive full credit:

Solution 3

$$1+7+17+31=56.$$

If this is all you write, we can't distinguish between your knowledge and your guessing skills.

2. Is the left hand sum approximation of $f(x) = 2x^2 - 1$ between 1 and 5 an underestimate or an overestimate? Explain why.

Solution 1

The function is increasing between 1 and 5 so the left hand sum will give an underestimate. *By the exam this is all you need to write. When you were first learning the material, drawing a picture might reassure us that you know why this is true. The following will never be sufficient:*

Solution 2

Underestimate because I know what f looks like.

The following, though descriptive, does not communicate to us that you know your statement holds for all increasing functions, not just polynomials. Hence you will lose points if you write:

Solution 3

This is an underestimate because the function is an increasing polynomial function.

We hope these examples show you that one of the reasons for assigning and grading work is to accurately determine what you know and to let you practice communicating. If you don't communicate to us that you know something, we will grade you as if you do not know it. If you tell us something incompletely or inaccurately, we will give you a score that reflects this. In that vein, if you are thinking of leaving a blank response, you should instead write down any information you have on that exercise so that we can discover what you know.

Grades are our way of telling your future employer how well we think you can complete course specific tasks. Our goal is that everyone can complete them in their entirety so we make sure you can complete even the small details, which might be regarded as being nit-picky. Our reputation

depends not on how many of any letter grade we give, but how accurately our assigned grades reflect your knowledge. With that in mind, we hope that you earn an A and we will do what we can to help you to that end!