1. The graph of $f$ is given below. When asked to estimate $\int_1^4 f(x)dx$ to five decimal place accuracy, a group of calculus students submitted the following answers. Although one response is correct, the others are incorrect. Using arguments your classmates would understand, identify the correct answer and explain why the others cannot be correct. Note: “Because it is the only answer remaining.” is not a sufficient reason for choosing a value.

Note: Copies of the graph are provided with each response in case you would like to refer to or use the graph in your explanation.

(a) -0.0367. This response is correct / incorrect (circle one). Explain why.

(b) 0.3672. This response is correct / incorrect (circle one). Explain why.
(c) 3.6719. This response is correct / incorrect (circle one). Explain why.

(d) 0.0367. This response is correct / incorrect (circle one). Explain why.
2. Use geometry to determine the **value of the following integrals** (this is NOT asking about total area). Be sure to provide a sketch of the graph of the function and state how you are using geometry to solve the integral. Credit will not be given to answers that do not use a geometric argument.

(a) \[ \int_{-1.5}^{1.5} \sqrt{2.25 - x^2} \, dx \]

(b) \[ \int_{0}^{2} (4 - 3x) \, dx \]

3. Artemis arrogantly asserts that

\[ \int \frac{1}{(x + 1)^2} \, dx = \frac{x}{x + 1} + C \]

Is Artemis correct? Explain/Show clearly (using calculus) how you know.

Note: DO NOT integrate the function. Find another method for determining if Artemis is correct.