

Name: _____

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Please circle your instructor's name:

James Gossell

Gordon Williams

There are 25 points possible on this quiz. Any outside materials are not allowed. **For full credit, show all work clearly.**

1. [12 points] Evaluate the following definite integrals. Use proper notation and **simplify** your final answers.

a. $\int_1^2 3x^2 - 2x^3 dx$

b. $\int_0^\pi 2\cos(t) + \sin(t) dt$

c. $\int_1^3 \frac{x^3 - 2x^2 + x}{x^2} dx$

2. [4 points] Suppose $F(x) = \int_1^{x^2} \ln(t) dt$. Find $F'(x)$.

$$F'(x) =$$

3. [9 points] We define $A(x)$ to be the elevation in feet above sea level at mile x on the Appalachian Trail going from south to north. The distance from the beginning of the Appalachian Trail to the end is 2198 miles, and thus the domain of $A(x)$ is $[0, 2198]$.

- a. It is a fact that $A(0) = 3782$ and $A'(0) = -346$. Explain what these values mean in the context of the problem. Include units in your explanation.

- b. Write a sentence interpreting the meaning of the value of $\int_0^{2198} A'(x) dx$ in the context of this problem. What are the units of this value?

- c. It is also a fact that $A(2198) = 5254$. With this information can you determine $\int_0^{2198} A'(x) dx$? If so, evaluate this integral. If not, explain why it is not possible.

- d. (1 point extra credit!) What would the value of $\int_0^{2198} |A'(x)| dx$ represent?