Honors Math 182 Quiz 3 Version A

Feel free to use the computers, your calculator, notes and textbooks while working on this quiz. You may also use online resources such as Wikipedia, Google and Wolfram Alpha; however, do not use email or any other messaging service during the quiz.

1. Find a function F(x) such that  $F'(x) = \sin(2x)$ .

2. A boat leaves a dock at 2:00pm and travels due south at a speed of 18km/h. Another boat has been heading due east at 14km/h and reaches the same dock at 3:00pm. At what time were the two boats closest together?

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**3.** Find a function G(x) such that  $G'(x) = \ln(x+1)$ .

4. Suppose that f is continuous and  $\varphi$  is continuous with continuous derivative  $\varphi'$ . Prove the change of variables formula

$$\int_{\varphi(\alpha)}^{\varphi(\beta)} f(t) dt = \int_{\alpha}^{\beta} f(\varphi(t)) \varphi'(t) dt.$$