Quiz 6

Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

Question:	1	2	3	4	Total
Points:	10	10	5	0	25
Score:					

Name and section: _____

1. Are the following state or path-dependent functions? Circle the correct answer.

   (a) (5 points) $f(a,b) = a\mathrm{e}^{ab+1}\,\mathrm{d}a + b\mathrm{e}^{ab+1}\,\mathrm{d}b$

   state or **path-dependent**

   (b) (5 points) $f(x,y) = \left(\mathrm{e}^{x-y} - \cos x \cos y\right)\mathrm{d}x - \left(\mathrm{e}^{x-y} - \sin x \sin y\right)\mathrm{d}y$

   state or **path-dependent**

2. (10 points) For one of the above that is a state function, find the function F such that $\mathrm{d}F = f$ where $\mathrm{d}F$ is the total derivative of F.

   $F =$

3. (5 points) Suppose we have a refinery that must ship finished goods to some storage tanks. Suppose further that there are two pipelines, A and B, to do the shipping. The cost of shipping x units on A is ax^2, and the cost of shipping y units on B is by^2, where $a > 0$ and $b > 0$ are given. What is the minimum cost to ship Q units?

   $\mathrm{cost}_{\mathrm{min}} =$

4. For fun if you finish early: Is the following a state or path dependent function?

$$g(x,y,z) = \mathrm{d}x\left(4y^2z^3\cos xy^2z^3\right) + \mathrm{d}y\left(8xyz^3\cos xy^2z^3\right) + \mathrm{d}z\left(12xy^2z^2\cos xy^2z^3\right)$$