Name: _____

Test Prep — Old Exam Pages (on 13.4, 14.1, 14.3) — Math 126

Participation:

- +1: show written work from one problem each of 14.1 and 14.3 homework
- +1: participate in this test prep

Page 1 — From Winter 2024 Exam 2: This is the entire first page of exam 1 from this test. The first question is on 13.4 and the others are from 14.3. Try them out and see how you could do, then look in the exam archive for solutions.

1. (14 pts)

   (a) Consider the position function

   $$\mathbf{r}(t) = \left\langle t^2, 6t, \frac{2}{t} \right\rangle.$$

   Find the positive value of t at which the acceleration vector and velocity vector are orthogonal AND give the tangential component of acceleration, a_T, at this time.

   $t =$ _____

   $a_T =$ _____

   (b) Find $f_x(x, y)$ and $f_y(x, y)$ for

   $$z = f(x, y) = y^x + y\sin(x^2 y) + \ln(x).$$

   $f_x(x, y) =$ _____

   $f_y(x, y) =$ _____

   (c) Find $\dfrac{\partial z}{\partial y}$ for

   $$z^3 + y^2 z = x\sqrt{3 + y^2}$$

   at $(x, y, z) = (1, 1, 1)$.

   $\dfrac{\partial z}{\partial y} =$ _____

Here is another page 1 from an old exam for you to try. BUT if you haven't started the 14.3 homework, then switch to doing that instead right now. That homework has two parts and I want you to dig into them now!

Page 2 — From Spring 2019 Exam 2

1. (11 pts)

   (a) Consider the position vector function

   $$\mathbf{r}(t) = \langle 6 + t,\ 2\tan^{-1}(t),\ 3t + e^{t^2} \rangle.$$

   Find the tangential component of acceleration at $t = 0$.

   (b) Use implicit differentiation to find $\dfrac{\partial z}{\partial y}$ for

   $$e^{2z} = x + y^2 z.$$

   Put your final answer in the form:

   $$\frac{\partial z}{\partial y} = \underline{\qquad\qquad\qquad\qquad\qquad\qquad}$$