MATH 237 Sochacki Home Work 2 Name _____
Oct. 18, 2016 Take Home 50 Points (Print) (1 point)

All necessary work must be shown for credit. Your work must represent the question asked. You may NOT use computers. You may use your notes or text. Your work must be neat or I will not grade your work. You may discuss this assignment with others, but all work turned in must be your own work and MUST only be on these sheets.

I have neither received nor given help on this exam. _____
(Signature) (1 point)

1. Let $\bar{r}(t)=\frac{2t-1}{1+t}\bar{i}+\frac{2\sin 2t}{t}\bar{j}+(1+2t)^{\frac{1}{t}}\bar{k}$. Give the following. (6 points)

(a) The domain for this curve.

(b) $\lim_{t\to 0}\bar{r}(t)$

(c) $\|\bar{r}\left(\frac{1}{2}\right)\|$

2. Consider the curve $\bar{r}(t)=\left\langle (2-t)e^{t},\left(8-t^{2}\right)e^{-t}\right\rangle$. (12 points)

(a) Give an ACCURATE sketch of this curve for $-\infty<t<\infty$.

(b) Give the speed along this curve at $t=2$.

(c) Give the unit tangent vector at $t = 2$.

(d) Give the curvature at $t = 2$.

3. Consider the curve $\bar{r}(t) = \langle 8\cos t + 8t\sin t, 3t^2, 8\sin t - 8t\cos t \rangle$. (12 points)

(a) Give $\overline{T}(s)$.

(b) Give $\overline{T}(t), \overline{N}(t), \overline{B}(t)$ at $t = \frac{\pi}{4}$.

(c) Give the curvature at $t = \pi$.

(d) Give the equation of the plane that contains the acceleration vector at $t = \frac{\pi}{4}$.

4. Let $z = f(x, y) = 4x + 3y$. Describe the graph of this function. (6 points)
(a) Describe the graph of this function.

(b) Simplify $f(x + \Delta x, y + \Delta y) - f(x, y)$.

(c) Describe the level curves for this function.

5. $z = f(x, y) = \dfrac{4}{\sqrt{x^2 - e^y}}$ (8 points)

(a) Give the domain and range of f.

(b) Give z_x and z_y.

(c) Give z_{xy} and z_{yx}.

(d) Give z_{xx}

6. Let $w = f(x, y, z) = \sqrt{x^2 + y^2 - z^2 + 9}$. (6 points)

(a) Describe the domain and range of f.

(b) Give $\dfrac{\partial f}{\partial x}$ and $\dfrac{\partial f}{\partial z}$.

(c) Give $\dfrac{\partial^2 f}{\partial x \partial y}$.