Worksheet #7; date: 02/08/2018
MATH 53 Multivariable Calculus

1. *(Stewart 12.6.11)* Use traces to sketch and identify the surface

$$x = y^2 + 4z^2.$$

2. *(Stewart 12.6.37)* Reduce the equation to one of the standard forms, classify the surface, and sketch it.

$$x^2 - y^2 + z^2 - 4x - 2z = 0.$$

3. *(Stewart 12.6.45)* Find an equation for the surface obtained by rotating the curve $y = \sqrt{x}$ about the x-axis.

4. *(Stewart 13.1.5)* Find the limit.

$$\lim_{t\to\infty} \left\langle \frac{1+t^2}{1-t^2}, \tan^{-1} t, \frac{1-e^{-2t}}{t} \right\rangle.$$

5. *(Stewart 13.1.15)* Draw the projections of the curve on the three coordinate planes. Use these projections to help sketch the curve.

$$\mathbf{r}(t) = \langle t, \sin t, 2\cos t \rangle.$$

6. *(Stewart 13.1.31)* At what points does the curve $\mathbf{r}(t) = t\mathbf{i} + (2t - t^2)\mathbf{k}$ intersect the paraboloid $z = x^2 + y^2$.

7. *(Stewart 13.1.43)* Find a vector function that represents the curve of intersection of the cone $z = \sqrt{x^2 + y^2}$ and the plane $z = 1 + y$.

8. *(Stewart 13.2.9)* Find the derivative of the vector function $\mathbf{r}(t) = \langle \sqrt{t-2}, 3, 1/t^2 \rangle$.

9. *(Stewart 13.2.19)* Find the unit tangent vector $\mathbf{T}(t)$ at the point with the given value of parameter t.

$$\mathbf{r}(t) = \cos t\mathbf{i} + 3t\mathbf{j} + 2\sin 2t\mathbf{k}, \qquad t = 0.$$