Quiz #4; Tuesday, date: 02/13/2018
MATH 53 Multivariable Calculus with Stankova
Section #117; time: 5 – 6:30 pm
GSI name: Kenneth Hung
Student name:

1. At what point do the curves $\mathbf{r}_1(t) = \langle t, 1-t, 8+t^2 \rangle$ and $\mathbf{r}_2(s) = \langle 4-s, s-3, s^2 \rangle$ intersect? Find their angle of intersection and leave the answer using inverse trigonometric function if necessary.

2. *True / False?* The equation

$$\frac{x^2}{a} + \frac{y^2}{b} + \frac{z^2}{c} = 1$$

can give rise to different quadric surfaces, depending on the number of negative signs among a, b and c. Since there can be 0, 1, 2 and 3, this can be four different types of quadric surface.

3. *True / False?* For any space curve with vector equation $\mathbf{r}(t)$, since $\mathbf{r}(t) \times \mathbf{r}(t) = \mathbf{0}$, we have

$$\mathbf{0} = \frac{d}{dt}[\mathbf{r}(t) \times \mathbf{r}(t)] = \mathbf{r}'(t) \times \mathbf{r}(t) + \mathbf{r}'(t) \times \mathbf{r}(t) = 2\mathbf{r}'(t) \times \mathbf{r}(t),$$

and so $\mathbf{r}'(t)$ must either be parallel to or in the opposite direction of $\mathbf{r}(t)$.