

"QUIZ" for Lecture 1

NAME: (print!) Joe Barry Section: 24

E-MAIL ADDRESS: (print!) jlb661@scarletmail.rutgers.edu

1. Show that the triangle with vertices $P = (1, 0, 0)$, $Q = (0, 1, 0)$, and $R = (0, 0, 1)$ is an equilateral triangle.

$$D_{PQ} = \sqrt{(0-1)^2 + (1-0)^2 + 0^2} = \sqrt{2}$$

$$D_{PR} = \sqrt{(0-1)^2 + (0-0)^2 + (1-0)^2} = \sqrt{2}$$

$$D_{QR} = \sqrt{(0-0)^2 + (0-1)^2 + (1-0)^2} = \sqrt{2}$$

This is an equilateral triangle because the distances between the vertices are equidistant

2. Determine whether the following two lines ever meet. If they do meet, where?

$$\mathbf{r}_1(t) = \langle 1, 0, 0 \rangle + t\langle 1, 2, 3 \rangle, \quad \mathbf{r}_2(t) = \langle 0, 1, 0 \rangle + t\langle 2, 1, 3 \rangle$$

$$\mathbf{r}_1(t) = \langle t+1, 2t, 3t \rangle \quad \mathbf{r}_2(s) = \langle 2s, s+1, 3s \rangle$$

$$\text{x component: } t+1 = 2s$$

$$\text{y component: } 2t = s+1$$

$$\text{z component: } 3t = 3s$$

$$t = s$$

$$\mathbf{r}_1(1) = \langle 2, 2, 3 \rangle \quad \mathbf{r}_2(1) = \langle 2, 2, 3 \rangle$$

The two lines intersect at $(2, 2, 3)$