

Homework Set 2

DUE: JAN 26, 2017 (IN CLASS)

1. What is the distance between the plane containing the points $(2, 1, 3)$, $(2, 2, 4)$, and $(1, 1, 6)$, and the point $S = (1, 1, 1)$?

2. Where does the plane that contains the lines

$$\vec{r}_1(t) = (3 - t, -4 + t, 4 + 2t) \quad \text{and} \quad \vec{r}_2(t) = (3 + t, -4 + t, 4 - t)$$

intersect the x -axis?

3. Find the equation of the plane passing through the point $(1, 3, 2)$ that contains the line $\vec{r}(t) = (1 + t, -1 - 2t, 3 + 2t)$.

4. Classify the type of the following conic sections (into ellipse, hyperbola, parabola, circle, or crossing lines):

- (i) $x^2 - 3y^2 = 1$

- (ii) $2x^2 + 8y^2 = 5$

- (iii) $y - x^2 = 0$

- (iv) $x^2 = y^2$

- (v) $7y^2 = 1 - 7x^2$

5. Classify the type of the following nondegenerate quadrics (into ellipsoid, elliptical paraboloid, elliptical cone, hyperboloid of one sheet, hyperboloid of two sheets, or hyperbolic paraboloid)

- (i) $x^2 + 3y^2 = z^2$

- (ii) $2y^2 + 4x^2 = 5z$

- (iii) $x^2 - y^2 = z$

- (iv) $x^2 + y^2 + 2z^2 = 2$

- (v) $z^2 = x^2 + y^2$

- (vi) $z^2 = x^2 + y^2 + 5$

- (vii) $7y^2 + 6x^2 = 9 + z^2$