

Homework 2, Calc III

Due Feb 11th, 2009

1. The following equations describe two lines:

$$\frac{x-2}{-4} = \frac{y-3}{2} = \frac{z-5}{-1},$$

$$\frac{x}{3} = \frac{y-5}{5} = \frac{z+3}{-2}.$$

For those two lines

- Determine if the lines are parallel, skew or intersecting.
 - If the lines are skew or parallel, find the distance between the two lines. If they intersect find the point of intersection.
2. The following two equations describe two planes in three dimensional space.

$$3x + 6y - 2z = 18$$

$$x - 5y + 3z = 12$$

- Find the angle between the two planes.
 - Find the line of intersection of the two planes.
3. Find the equation of the plane containing the line

$$x = 4 + 2t, \quad y = 3 - t, \quad z = 6 + \frac{1}{2}t$$

and the point $P(3, 6, 2)$.

4. Find the distance from the point $P(3, 2, 6)$ to the line

$$x = 3 - 4t, \quad y = 4 + t, \quad z = 1 - 3t.$$

Hint: You might want to find the point on the line closest to P .