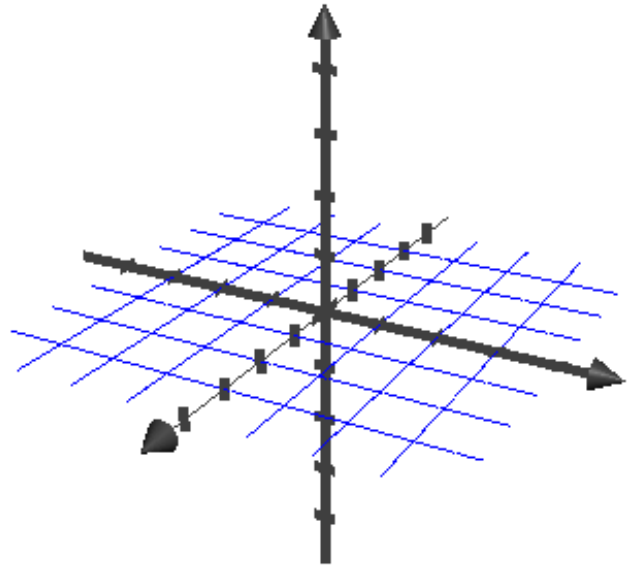# Planes in 3D

1. Sketch the plane $3x - 2y + 2z = 6$.

2. Where does the line $x = y - 1 = 2z$
   intersect the plane $3x - 2y + 2z = 6$?

3. Consider the planes $3x - 2y + z = 1$ and $2x + y - 3z = 3$

   (a) Find the angle between the two planes.

   (b) Find the line of intersection between the two planes.

4. Find the distance from the origin to the plane $3x - 2y + 2z = 6$.

§10.5 Conic Sections

- The equation of a *parabola* with focus $(0, p)$ and directrix $y = -p$ is

$$x^2 = 4py.$$

  The equation of a parabola with focus $(p, 0)$ and directrix $x = -p$ is

$$y^2 = 4px.$$

- The ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \qquad a \geq b > 0$$

  has foci $(\pm(a^2 - b^2), 0)$ and vertices $(\pm a, 0)$, $(\pm b, 0)$.

- The hyperbola

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1, \qquad a \geq b > 0$$

  has foci $(\pm(a^2 + b^2), 0)$ and vertices $(\pm a, 0)$ and asymptotes $y = \pm(b/a)x$.

3D Conic Sections

Match each function to its graph

$9x^2 + 36y^2 + 4z^2 = 36$ $\qquad\qquad$ $4x^2 + 9y^2 - 4z^2 = 0$ $\qquad\qquad$ $36x^2 + 9y^2 - 4z^2 = 36$