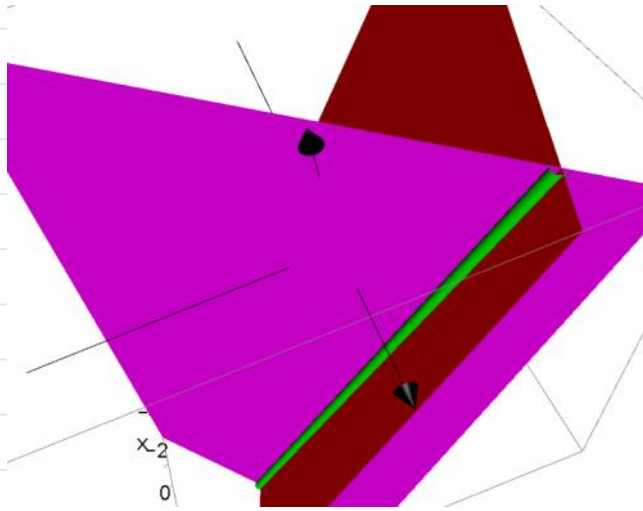


# Intersection of 2 Planes - Finding Equation of Line

Find the equation of the line where the two planes intersect

$$x + 3y - 2z = 7 \quad \textcircled{1}$$

$$2x - 2y + z = 3 \quad \textcircled{2}$$



Eliminate z, write y in terms of x

$$2 \times \textcircled{2} \quad 4x - 4y + 2z = 6 \quad \textcircled{A}$$

$$x + 3y - 2z = 7 \quad \textcircled{B}$$

$\textcircled{A} + \textcircled{B}$

$$5x - y = 13$$

$$5x - 13 = y$$

Eliminate y, write z in terms of x

$$2 \times \textcircled{1} \quad 2x + 6y - 4z = 14 \quad \textcircled{C}$$

$$3 \times \textcircled{2} \quad 6x - 6y + 3z = 9 \quad \textcircled{D}$$

$\textcircled{C} + \textcircled{D}$

$$8x - z = 23$$

$$8x - 23 = z$$

Write equation of line in parametric form

$$x = x$$

$$y = 5x - 13$$

$$z = 8x - 23$$

$$x = \lambda$$

$$y = 5\lambda - 13$$

$$z = 8\lambda - 23$$

Parametric form

Convert into other forms if necessary

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 0 \\ -13 \\ -23 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 5 \\ 8 \end{pmatrix}$$

Vector form

$$x = \lambda$$

$$\frac{y + 13}{5} = \lambda$$

$$\frac{z + 23}{8} = \lambda$$

$$x = \frac{y + 13}{5} = \frac{z + 23}{8}$$

Cartesian form