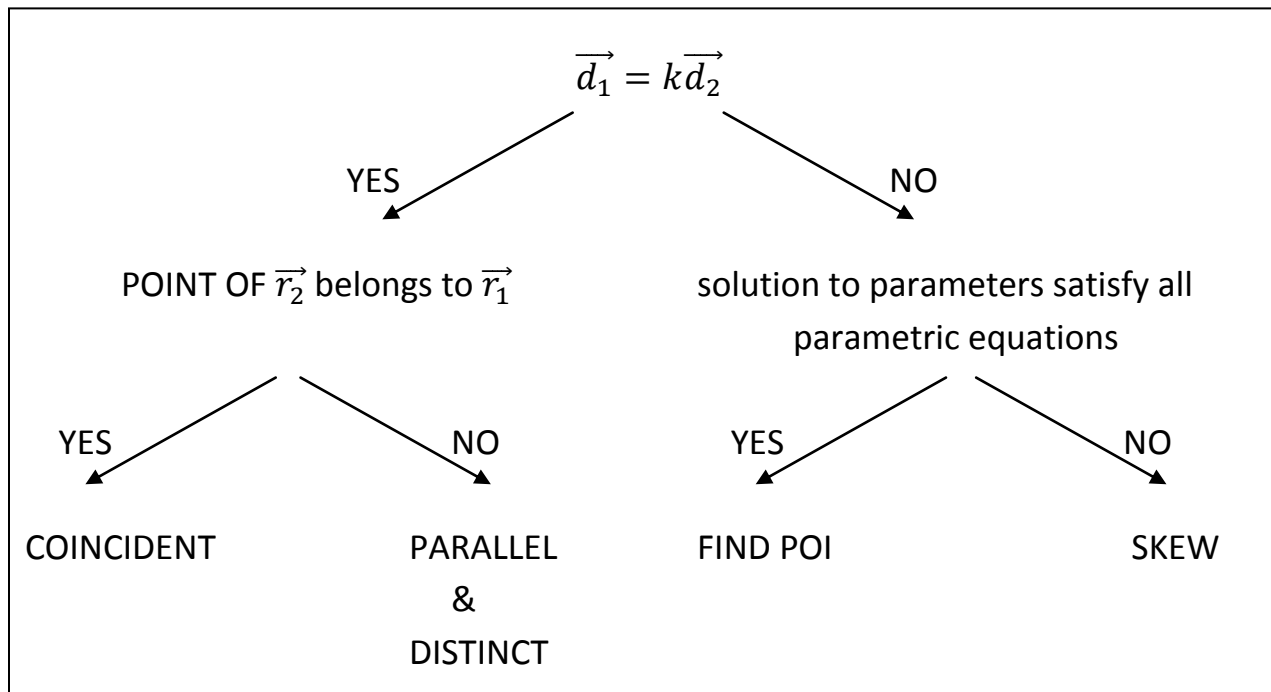**MCV 4U**

INTERSECTION OF TWO LINES

2 LINES IN 3D SPACE may be described as...

① **COINCIDENT:** infinite number of common points

② **PARALLEL & DISTINCT**: no point of intersection

③ **INTERSECT AT A POINT**: find the poi

④ **SKEW:** lines that are not parallel and do not intersect
-- lie in different planes

In order to determine how 2 lines are related, use the flow-chart below:

$$\vec{d_1} = k\vec{d_2}$$

YES   NO

POINT OF $\vec{r_2}$ belongs to $\vec{r_1}$ solution to parameters satisfy all
parametric equations

YES   NO   YES   NO

COINCIDENT   PARALLEL   FIND POI   SKEW
&
DISTINCT

EXAMPLES: Describe the nature of each pair of lines.

① $\vec{r_1} = (-1, 1, 0) + t(3, 4, -2)$ and $\vec{r_2} = (-1, 0, -7) + s(2, 3, 1)$

② $\vec{r_1}$: $x - 2 = 1 - y = z$ and $\vec{r_2}$: $\frac{x-3}{2} = \frac{y}{3} = -z - 1$

③ $\vec{r_1}$: $-x + 2 = \frac{1-y}{3} = \frac{z}{2}$ and $\vec{r_2}$: $\frac{x-2}{2} = \frac{y+1}{4} = z - 5$