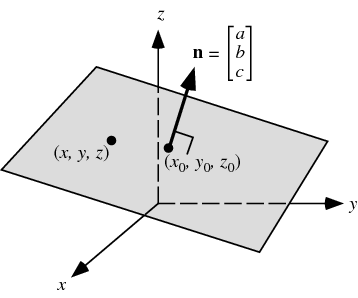
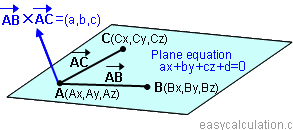
**8.5 – The Cartesian Equation of a Plane**



Suppose you know a point on the plane, then [x-x0,y-y0, z-z0] is a vector on the plane. Since the normal is perpendicular to the plane, [x-x0,y-y0, z-z0] • [a,b,c] = 0. We use this fact to come up with the Cartesian Equation of the plane.

**Example:** A plane contains point (2,4,-1) and has normal [3,1,-4]. Determine the equation of the plane.

Notice: It is easy to find a normal to a plane! Use the cross product since the cross product yields a vector perpendicular to two vectors.

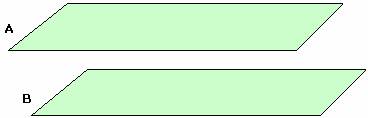
[](http://easycalculation.com/analytical/cartesian-plane-equation.php)

**Example:** Determine the Cartesian equation of the plane that has points A(-3,2,1), B(4,2,1) and C(-1,-4,5)

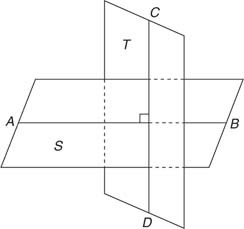
**Example:** Determine the Cartesian form of a plane whose vector form is

**Example:** Determine the vector and parametric equations of the plane with Cartesian equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

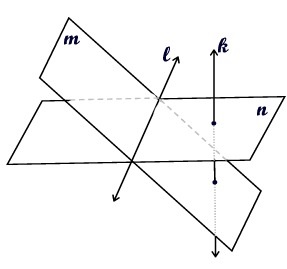
What is true about the normals for two planes that are parallel?

****

What is true about the normal of two planes that are perpendicular?

[](http://www.linkstolearning.com/links/NewYork/geometry_-_high_school.htm)

How can you find the angle between two intersecting planes?

[](http://www.google.ca/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&docid=TvI0EoRxmcVmVM&tbnid=T3DE_nLNlkJuAM:&ved=0CAUQjRw&url=http://www.regentsprep.org/Regents/math/geometry/PracticeTests/MCTestG2.htm&ei=U8akUeX3LYiQqwHDu4CoCA&bvm=bv.47008514,d.aWc&psig=AFQjCNH_ox3RPG1kmKQJt114KuBLf6lsEw&ust=1369839502305754)

**Example:** Show that the two planes are perpendicular.

π1: 3x – 2y +4z +3 = 0 and π2: 10x +5y – 5z +8 = 0

**Example:** Show that the two planes are parallel.

π1: 3x – 2y +4z +3 = 0 and π2: 15x -10y +20z +8 = 0

**Example:** Determine the angle between the two planes.

π1: 5x – 2y +2z +3 = 0 and π2: x +5y – 2z +8 =

**Homework: pg468 #1-14**