Challenge Set #1

1) Find the scalar equation of the line with normal $\vec{n} = (-3,1)$ passing through $P(4,3)$ {3x-y-9=0}

2) Find the vector equation of the line perpendicular to $2x - 3y + 9 = 0$ and passing through the y intercept of $\begin{cases} x = -4 + k \\ y = 3 - 2k \end{cases}$. {(x,y)=(0,-5)+t(2,-3)}

3) Find the scalar equation of the line perpendicular to $3x - y + 7 = 0$ passing through $P(2,-3)$. {x+3y+7=0}

4) Determine the angle between the line $2x - 5y - 7 = 0$ and $(x, y) = (-1,-2) + t(1,3)$ {50°}

5) Use vectors to show that (5,8) and (17,-22) are points on the line that passes through $A(7,3)$ with direction vector $(2,-5)$.

6) Determine vector equations for any two lines, not parallel to an axis, which have an angle of $30°$ between them.

7) Find the parametric equation for the line $y = \frac{3}{4}x + 7$. $\begin{cases} x = 4t \\ y = 7 + 3t \end{cases}$

8) Do these represent the same line?

a) $\ell_1 : (x, y) = (-1,3) + t(-2,4)$, $\ell_2 : 2x + y - 1 = 0$ {identical}

b) $\ell_1 : (x, y) = (-1,4) + t(-1,4)$, $\ell_2 : 4x + y - 3 = 0$ {parallel}

9) How would we extend these equations for lines in 2 space so that they would work in 3 space?

10) Determine the point where the lines $2x - 5y - 7 = 0$ and $(x, y) = (-1,-2) + t(1,3)$ cross each other. Use vector concepts.