Suppose L_1 is described parametrically by $c_1(t) = (3t + 1 , 7t + 2 , -t + 1)$ and L_2 is described parametrically by $c_2(s) = (2s - 2 , s + 6 , -2s + 6)$.

a) These lines intersect each other when their x,y,and z components are equal. That is...

x)	$3t + 1 = 2s - 2$	$\Rightarrow$	$s = (3/2)(t + 1)$			
y)	$7t + 2 = s + 6$	$\Rightarrow$	$7t + 2 = (3/2)(t + 1) + 6$	$\Rightarrow$	$t = 1$
z)	$-t + 1 = -2s + 6$	$\Rightarrow$	$-(1) + 1 = -2s + 6$	$\Rightarrow$	$s = 3$

Plugging ($t = 1$) into $c_1(t)$ yields (4,9,0). Similarly, plugging ($s = 3$) into $c_2(s)$ yields (4,9,0). Therefore, we find that $c_1(t)$ and $c_2(s)$ intersect at (4,9,0).

b) The direction vectors of the parametrizations $c_1(t)$ and $c_2(s)$ are, respectively, $\langle 3, 7, -1 \rangle$ and $\langle 2, 1, -2 \rangle$. By taking the cross product of these two vectors we get a normal vector perpendicular to both L_1 and L_2. So...

$$\langle 3, 7, -1 \rangle \times \langle 2, 1, -2 \rangle = \det \begin{matrix} i & j & k \\ 3 & 7 & -1 \\ 2 & 1 & -2 \end{matrix}$$

$= (7(-2) - 1(-1)) \cdot i - (3(-2) - 2(-1)) \cdot j + (3(1) - 7(2)) \cdot k$
$= -13 \cdot i + 4 \cdot k - 11 \cdot k = \langle -13, 4, -11 \rangle$.

Therefore, we have a point on both lines, (4,9,0), and a normal vector, $\langle -13, 4, -11 \rangle$, so our equation for the plane containing L_1 and L_2 is...

$$-13 \cdot (x - 4) + 4 \cdot (y - 9) - 11 \cdot (z - 0) = 0, \text{ or}$$

$$-13x + 4y - 11z = -16$$