Solution.

a) $\dfrac{x-t}{-1}=\dfrac{y-t^2}{2}=\dfrac{t}{3}$
$\Rightarrow 2x-2t=-y+t^2, \quad 3y-3t^2=2z$
$\Rightarrow 6x-6t=-3y+3t^2, \quad 3t^2=3y-2z$
$\Rightarrow 6x-6t=-3y+3y-2z \quad \Rightarrow \quad t=\frac{x-z}{3}$
$\Rightarrow 3y-3(\dfrac{x-z}{3})^2=2z$

b) Taking $Q(x-t,\ y+2t,\ z+3t)$ on r, one has
$(x-t)^2=2(z+3t), \quad (y+2t)-(z+3t)=1$
$\Rightarrow (x-t)^2=2(z+3t), \quad t=y-z-1$
$\Rightarrow (x-y+z+1)^2=2(z+3y-3z-3)$
$\Rightarrow x^2+y^2+z^2-2xy+2xz-2yz+2x-8y+6z+7=0$

0.1. Cones. A surface S generated by a variable line l passing through a fixed point P_0 and subject to another condition such as intersecting a curve r (or remaining tangent to a given surface Σ) is called a <u>cone</u>.

The line l is the <u>generatrix</u>, r the <u>directrix</u>, and P_0 the <u>vertex</u> of the cone S, and we say that S is defined by P_0 and r.

<u>Equation of a cone</u>
<u>The equation of the cones defined by $P_0(x_0, y_0, z_0)$ and</u>
a) <u>$r: x=f(t),\ y=g(t),\ z=h(t)$,</u>
b) <u>$r: F(x,y,z)=0,\ G(x,y,z)=0$</u>