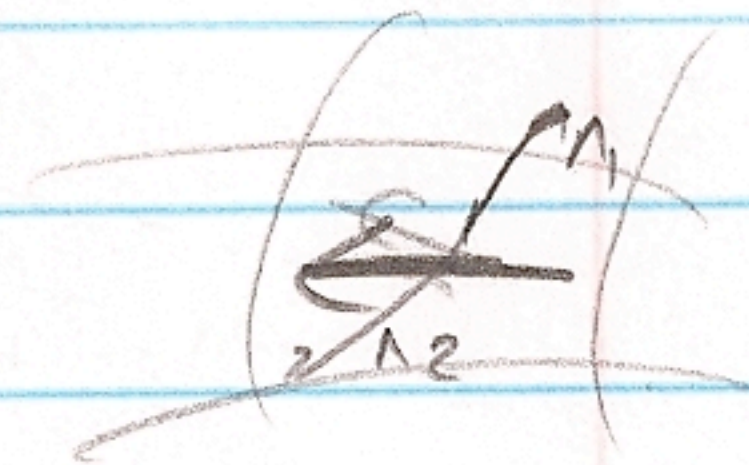


### Examp 03

10 A point moves on intersection of  
 $z = x^2 + \frac{1}{4}y^2$  and  $x^2 + y^2 = 25$   
 $x = 3, y = 4, x' = 4$  at  $t = 0$   
Find  $y'$  and  $z'$  at  $t = 0$



Need to find velocity vector  
 $n_1 \times n_2 = \text{velocity}$

$$f(x) = x^2 + \frac{1}{4}y^2 - z \quad g(x) = x^2 + y^2 - 25$$

$$\nabla f(x) = \langle 2x, \frac{1}{2}y, -1 \rangle \quad \nabla g(x) = \langle 2x, 2y, 0 \rangle$$

$$x = 3, y = 4$$

$$n_1 = \nabla f(x) = \langle 6, 2, -1 \rangle \quad n_2 = \nabla g(x) = \langle 6, 8, 0 \rangle$$

$$n_1 \times n_2 = \langle 8, 6, 36 \rangle = \langle x', y', z' \rangle$$

$$\text{Since } x' = 4, c = \frac{1}{2}$$

$$\text{and} \\ y' = 3 \\ z' = 18$$