1 Intro

Let's assume that $x_1, y_1 = (0, 0)$ and $x_2 = 0$. Then we have:

$$E = -Cy_2$$
$$Dx_3 = -(Ax_3^2 + Bx_3y_3 + C(y_3^2 - y_2y_3))$$

Renaming things:

$$E = C\beta \tag{1}$$
$$D = A\alpha_a + B\alpha_b + C\alpha_c \tag{2}$$

2 Working with a and b

Let's call q the normalizor factor:

$$q = \frac{64(BDE - AE^2 - CD^2)}{(4AC - B^2)^2}$$