Task. What is the reflection point of origin about a line a with equation $x - 2y + 2 = 0$.

Solution. The normal vector to the line is

$$n = (1, -2).$$

Let b be the line passing through the origin and parallel to n. Then b is given by parametric equations:

$$x = t, \qquad y = -2t.$$

The origin corresponds to $t = 0$.

Let us find the intersection point A of a and b. For this we substitute x and y into the equation of line a:

$$t - 2(-2t) + 2 = 0$$
$$t + 4t = -2$$
$$5t = -2$$
$$t = -2/5 = -0.4.$$

Hence the reflection point of origin about a corresponds to the parameter $2t = 2 \cdot (-0.4) = -0.8$. And so this point is

$$(-0.8, -2 \cdot (-0.8)) = (-0.8, 1.6).$$