Task. ABC are collinear points and A is at $(4, -5)$ while B is at $(-3, 2)$. What is the location of C if AC is four times AB?

Solution. Let us write the parametric equation of the line AB. It is parallel to a vector $AB = (-3 - 4, 2 - (-5)) = (-7, 7)$, whence it has the following equation:

$$x = 4 - 7t, \qquad y = -5 + 7t.$$

The point B corresponds to $t_B = 1$.

Let t_C be the parameter corresponding to C such that $AC = 4AB$. Then either

$$t_C = 4, \qquad \Rightarrow \qquad C = (4 - 7 * 4, -5 + 7 * 4) = (-24, 23)$$

or

$$t_C = -4, \qquad \Rightarrow \qquad C = (4 - 7 * (-4), -5 + 7 * (-4)) = (32, -33).$$

Answer. $C = (-24, 23)$ or $C = (32, -33)$.