Solution: the equation of the line can also be rewritten in this way $y = x - \frac{1}{2}$. The distance between any point on the plane (x, y) and the point $(-4, 3)$ is

$$L = \sqrt{(x+4)^2 + (y-3)^2}$$

We are looking for the point on the line, which is closest to the point $(-4, 3)$, so we substitute the line equation $y = x - \frac{1}{2}$ in the previous expression:

$$L = \sqrt{(x+4)^2 + \left(x - \frac{7}{2}\right)^2}$$

Now we have the distance between the point $(-4, 3)$ and the line as the function of x. Let us find the minimum of this function. The derivative of $L(x)$ is

$$L'(x) = \frac{2(x+4) + 2(x - \frac{7}{2})}{2\sqrt{(x+4)^2 + \left(x - \frac{7}{2}\right)^2}} = \frac{4x + 1}{2\sqrt{(x+4)^2 + \left(x - \frac{7}{2}\right)^2}}$$

From condition $L'(x) = 0$ we find value x_0, for which the distance is minimal:

$$L'(x) = 0 \Longrightarrow 4x + 1 = 0 \Longrightarrow x_0 = -\frac{1}{4}$$

Substituting value x_0 in the line equation $y = x - \frac{1}{2}$ we obtain the ordinate y_0 of the point

$$y_0 = x_0 - \frac{1}{2} = -\frac{3}{4}$$

Finally, we have the point $(x_0, y_0) = \left(-\frac{1}{4}, -\frac{3}{4}\right)$ on the line $y = x - \frac{1}{2}$, which is closest to the point $(-4, 3)$.

Answer: $(x_0, y_0) = \left(-\frac{1}{4}, -\frac{3}{4}\right)$.