TEX document #10

In Stewart (and many other textbooks) the numerator $M\bar{x}$ is denoted by $M_{yz}$ in three-dimensional problems, and by $M_y$ in two-dimensional problems. (The reason is that this quantity is the average of the displacement of the matter from the $y$-$z$ plane or the $y$ axis, respectively. Note that this notation is consistent with the one for moments of inertia, where $I_z$ is the average of the square of the displacement from the $z$ axis, for example.) Consequently, the formulas for the center of mass in two dimensions are

$$\bar{x} = \frac{M_y}{M}\,, \qquad \bar{y} = \frac{M_x}{M}\,.$$

These formulas strike some of us as illogical and confusing, which is why we avoid using them.