6. The centers of mass (with centimeters understood) for each of the five sides are as follows:

$$(x_1, y_1, z_1) = (0, 20, 20) \quad \text{for the side in the } yz \text{ plane}$$
$$(x_2, y_2, z_2) = (20, 0, 20) \quad \text{for the side in the } xz \text{ plane}$$
$$(x_3, y_3, z_3) = (20, 20, 0) \quad \text{for the side in the } xy \text{ plane}$$
$$(x_4, y_4, z_4) = (40, 20, 20) \quad \text{for the remaining side parallel to side 1}$$
$$(x_5, y_5, z_5) = (20, 40, 20) \quad \text{for the remaining side parallel to side 2}$$

Recognizing that all sides have the same mass *m*, we plug these into Eq. 9-5 to obtain the results (the first two being expected based on the symmetry of the problem).

(a) The *x* coordinate of the center of mass is

$$x_{\text{com}} = \frac{mx_1 + mx_2 + mx_3 + mx_4 + mx_5}{5m} = \frac{0 + 20 + 20 + 40 + 20}{5} = 20 \text{ cm}$$

(b) The *y* coordinate of the center of mass is

$$y_{\text{com}} = \frac{my_1 + my_2 + my_3 + my_4 + my_5}{5m} = \frac{20 + 0 + 20 + 20 + 40}{5} = 20 \text{ cm}$$

(c) The *z* coordinate of the center of mass is

$$z_{\text{com}} = \frac{mz_1 + mz_2 + mz_3 + mz_4 + mz_5}{5m} = \frac{20 + 20 + 0 + 20 + 20}{5} = 16 \text{ cm}$$