

## Quiz #9

Name: \_\_\_\_\_ Section and / or TA: \_\_\_\_\_

Answer all questions in a clear and concise manner. Unsupported answers will receive no credit.

1. (2 points) The masses  $m_i$  are located at the points  $P_i$ . Find the moments  $M_x$  and  $M_y$  and the center of mass of the system:

$$m_1 = 4, m_2 = 2, m_3 = 4;$$
$$P_1(2, -3), P_2(-3, 1), P_3(3, 5).$$

**Solution:**

$$M_x = \sum_{i=1}^3 m_i y_i = 4(-3) + 2(1) + 4(5) = 10.$$

$$M_y = \sum_{i=1}^3 m_i x_i = 4(2) + 2(-3) + 4(3) = 14.$$

$$m = \sum_{i=1}^3 m_i = 4 + 2 + 4 = 10.$$

Then we have:

$$\bar{x} = \frac{M_y}{m} = \frac{14}{10} = \frac{7}{5}.$$

$$\bar{y} = \frac{M_x}{m} = \frac{10}{10} = 1.$$

2. (2 points) Eliminate the parameter to find a Cartesian equation of the curve:

$$x = 2t - 1, y = \frac{1}{2}t + 1.$$

**Solution:**

$$x = 2t - 1 \implies t = \frac{x+1}{2},$$

$$y = \frac{1}{2}t + 1 \implies t = 2(y - 1).$$

Then we have:

$$2(y - 1) = \frac{x+1}{2} \implies y = \frac{1}{4}x + \frac{5}{4}.$$