Force and Motion 4

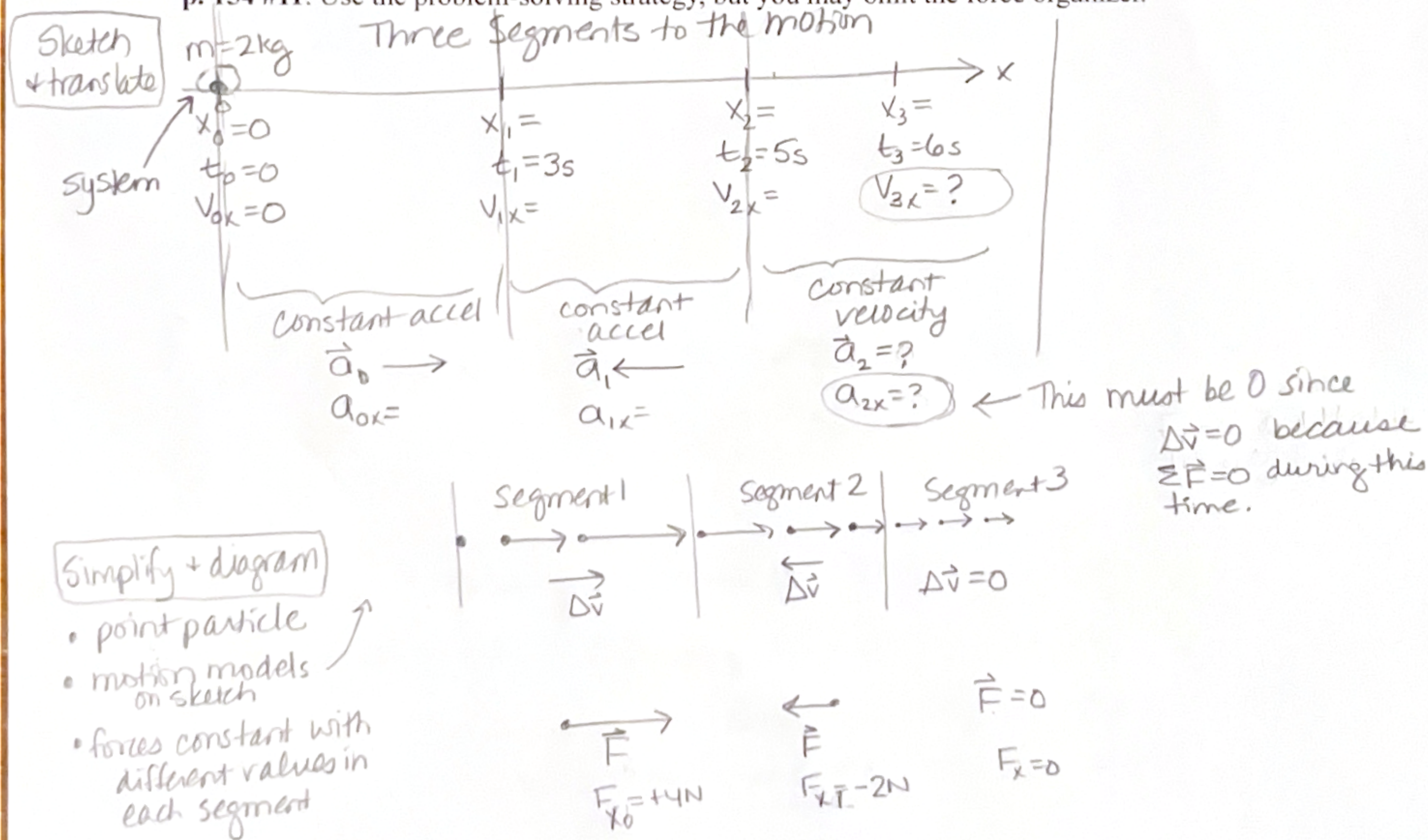
Name: ________________

Date: ________________

As stated on the syllabus:

- You may consult posted solutions for help. If doing so, first write a * at the point in your work where you look at the solutions (every time). After looking at the solutions, close them or move to another room to continue your work.
- You must use the solutions to check your completed work for correctness. Correctly re-do anything you missed.
- No writing of any kind is ever allowed while the solutions are visible to you.

p. 154 #11: Use the problem-solving strategy, but you may omit the force organizer.



Represent mathematically

I need V_{3x} at $t_3 = 6s$. This velocity is the same as V_{2x} since after $t=5$, the object has constant velocity. To find V_{2x}, I first have to find the acceleration in the 1st two segments:

① Find a_{0x}

$$a_{Sx} = \frac{\Sigma F_{on S x}}{m_S}$$

$$a_{0x} = \frac{F_{x D \text{ on}}}{m_{object}}$$

$$a_{0x} = \frac{+4N}{2kg}$$

$$\boxed{a_{0x} = 2\,m/s^2}$$

② Find V_{1x}

$$V_{fx} = V_{ix} + a_x \Delta t$$

$$V_{1x} = V_{0x} + a_0 \Delta t$$

$$V_{1x} = 0 + (2\,m/s^2)(3s)$$

$$\boxed{V_{1x} = 6\,m/s}$$

③ Find a_{1x}

$$a_{Sx} = \frac{\Sigma F_{on S x}}{m_S}$$

$$a_{1x} = \frac{F_{x1}}{m_{object}}$$

$$a_{1x} = \frac{-2N}{2kg}$$

$$\boxed{a_{1x} = -1\,m/s^2}$$

④ Find V_{2x}

$$V_{fx} = V_{ix} + a_x \Delta t$$

$$V_{2x} = V_{1x} + a_1 \Delta t$$

$$V_{2x} = 6\,m/s + (-1\,m/s^2)(2s)$$

$$\boxed{V_{2x} = 4\,m/s}$$

The object's velocity at $t = 6s$ is ($4\,m/s$, +x-direction), and its acceleration is 0.

Given the magnitude of the forces and time intervals, this is a reasonable velocity and the units are correct.