0.1 Homework 01 - Forces + Newton's Laws

9.

$$x''(0.7) = -16.8$$

$$y''(0.7) = -18$$

a)

$$a = \sqrt{16.8^2 + 18^2} = 24.62$$

$$ma = (0.340)(24.62) = \boxed{8.37N}$$

b) $-133.025°$

c)

$$\arctan\left(\frac{v_y}{v_x}\right)\Big|_{t=0.7} = \boxed{-124.716°}$$

13.

$$\begin{bmatrix} 9.8 & -9.8 \\ 49-9.8 & -9.8 \\ 58.8-49 & -9.8 \\ 98-58.8 & -9.8 \end{bmatrix} X = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

$$X = \begin{bmatrix} 1 & 1 \\ 1 & 4 \\ 1 & 1 \\ 1 & 4 \end{bmatrix}^T$$

Therefore, $\boxed{A = 4\text{kg}, B = 1\text{kg}, C = 4\text{kg}, D = 1\text{kg}}$

17.

a) $8.5g\sin(30) = \boxed{41.65}\,N$

b) $8.5g\cos(30) = \boxed{72.14}\,N$

c)

$$a = \frac{8.5g\sin(30^c irc)}{8.5} = 5.02N$$

26.

27.

41.

44.

54.