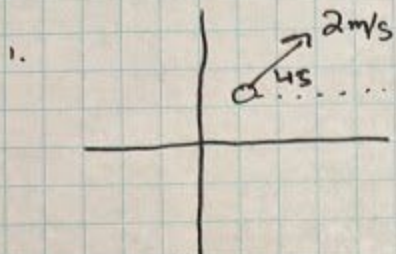


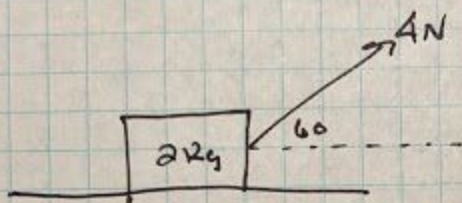
Answers - Motion in 2 Dimensions



$$v_x = 2 \cos 45 = 1.414 \text{ m/s}$$

$$v_y = 2 \sin 45 = 1.414 \text{ m/s}$$

2.



a) Force in x direction is

$$F_x = 4 \cos 60 = 2 \text{ N}$$

$$a = \frac{F}{m} = \frac{2 \text{ N}}{2 \text{ kg}} = 1 \text{ m/s}^2$$

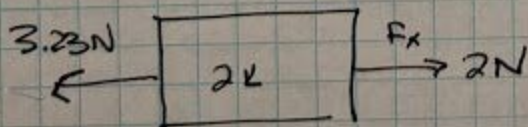
b) $v = a \cdot t = 1 \text{ m/s}^2 \cdot 5 \text{ s}$

$$v = 5 \text{ m/s}$$

3. First calculate the weight of the box. The weight is $mg \downarrow$ but the rope pulls up with force $F_y \uparrow$

$$\begin{aligned} \text{Weight } F_{\text{friction}} &= mg - F_y = (2)(9.81) - (4)(\sin 60) \\ &= 19.62 - 3.46 \\ &= 16.16 \text{ N} \end{aligned}$$

$$F_{\text{friction}} = \mu \cdot \text{weight} = 0.2 \cdot 16.16 \text{ N} = 3.23 \text{ N}$$



Since the force of friction is greater than the pulling force, the box will not move

$$F_f > F_x \text{ so } \underline{a = 0}$$