

Physics 101-Rec
Quiz # 4

Instructor: Dr. Mekki

Name: Key Id#: _____ Sect. #: _____

Five forces pull on a 4.0 kg box in an overhead view. Find the box's acceleration
(a) in unit vector notation

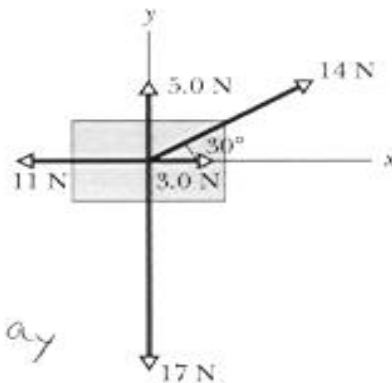
$$\sum F_x = 14 \cos 30^\circ + 3 - 11 = m a_x$$

$$\Rightarrow a_x = 1.03 \text{ m/s}^2$$

$$\sum F_y = 5 + 14 \sin 30^\circ - 17 = m a_y$$

$$\Rightarrow a_y = -1.25 \text{ m/s}^2$$

$$\boxed{\vec{a} = 1.03 \hat{i} - 1.25 \hat{j}} \text{ (m/s}^2\text{)}$$



(b) In magnitude and direction.

$$|\vec{a}| = \sqrt{(1.03)^2 + (1.25)^2} = 1.62 \text{ m/s}^2$$

$$\theta = \tan^{-1}\left(\frac{-1.25}{1.03}\right) = -50.5^\circ$$

