Motion on an inclined plane

Find velocity from acceleration

Introduction to Force and motion

### Inclined plane



Copyright © 2004 Pearson Education, Inc., publishing as Addison Wesley

**Physical representation** 

# Estimate the angle of slope or a run.



## Finding velocity from acceleration





### Forces and motion



Copyright © 2004 Pearson Education, Inc., publishing as Addison Wesley





### **F** = ma Newton' second Law



**Q1:** A rubber band stretched to the standard length causes an object to accelerate at 1 m/s<sup>2</sup>. Another object with twice the same is pulled by five rubber band stretched to the same length The acceleration is

1) 0.5 m/s^2; 2) 1m/s^2; 3) 2.5m/s^2; 4) 5m/s^2.



An object moving in a straight line at constant velocity is in dynamic equilibrium:  $\vec{F}_{net} = \vec{0}$ .

Copyright © 2004 Pearson Education, Inc., publishing as Addison Wesley

### Inertial reference frame

(b)



#### The ball stays in place.

A ball with no horizontal forces stays at rest in an airplane cruising at constant velocity. The airplane is an inertial reference frame.

Copyright © 2004 Pearson Education, Inc., publishing as Addison Wesley



The ball rolls to the back.

The ball rolls to the back of the plane during takeoff. An accelerating plane is not an inertial reference frame.

Copyright © 2004 Pearson Education, Inc., publishing as Addison Wesley

#### Only in an inertial reference frame, Newton's laws are valid.

**(a)**