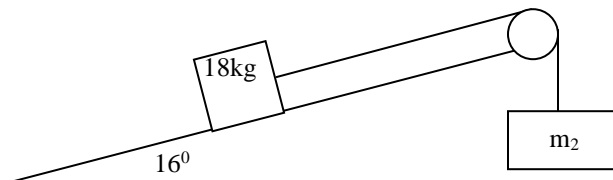


Dynamics Review #2

- Two boxes are resting beside each other. One is 15kg and the other is 23kg. If I push with 75N on the 15kg box, find
 - The acceleration
 - The force the 15kg exerts on the 23kg box
- Two sisters are skating on ice with no friction. One sister is 30kg and the other is 40kg. Find the acceleration of each person if the first girl pushes her sister with 200N.
- While standing in an elevator, I hold a 5kg bag of groceries. How heavy (force) does the bag feel if the elevator
 - Is moving at a constant 3m/s up
 - Is accelerating at 3m/s² up
 - Is accelerating at 3m/s² down
- What applied force accelerates a 20 kg stone straight up into the air at 10m/s²?
- A crane needs to lift a 1000kg load to the top of a 50m building in a minimum time of half a minute. If the load starts on the ground at rest, find the minimum strength of the cable needed. **Hint:** The load can have a constant acceleration. Find this first.
- If I pull up on a giant 300kg peach with 300N, find the normal force.
- If I pull a 20kg sled with 30N upwards at an angle of 40°, Find
 - The normal force
 - The net force
 - The acceleration
- While pushing a frictionless lawn mower with 70N at an unknown angle I accelerate the 7kg mower at 3m/s², find
 - The x-direction (forward) force I apply
 - The angle I'm pushing at
 - The normal force on the mower.
- Find the mass of m_2 in order for there to be an acceleration of 2.5m/s² up the ramp?



Dynamics Review #2 – Answers

1. a) $a = 1.97\text{m/s}^2$ b) $F = 45.3\text{N}$
2. $a_1 = 6.67\text{ m/s}^2$ $a_2 = - 5.00\text{ m/s}^2$
3. a) $F_a = 49\text{N}$ b) $F_a = 64\text{N}$ c) $F_a = 34\text{N}$
4. $F_a = 396\text{N}$
5. $a = 0.111\text{m/s}^2$ $F_T = 9911\text{N}$
6. $F_N = 2640\text{N}$
7. a) $F_N = 177\text{N}$ b) $F_{\text{net}} = 23.0\text{N}$ c) $a = 1.15\text{m/s}^2$
8. a) $F_{\text{ax}} = 21\text{N}$ b) $\theta = 72.5^\circ$ Below horizontal c) $F_N = 135\text{N}$
9. $m = 12.8\text{kg}$