## **Inclined Plane Problems**

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- 1. A block of 10 kg is pulled up by a rope on a ramp inclined  $20^{\circ}$ .
  - a) How much does the block weigh?
  - b) Find the magnitude of the normal force.
  - c) What is the tension in the rope if the acceleration of the block is  $0.5 \text{ m/s}^2$  in the direction of pulling?

- 2. A block of 15kg is on a  $45^0$  inclined plane.
  - a) Find the magnitude of the gravitational force acting on the block
  - b) Find the magnitude of the normal force.
  - c) What force should be applied up the plane to keep the block in equilibrium?

3. A block of mass of 5kg is released from the top of an inclined plane of length of 1m and an angle of 25<sup>0</sup>. The surface of contact is frictionless



- a) Draw the free body diagram for the block
- b) Find the magnitude of the gravitational force
- c) Find the magnitude of the perpendicular component of the gravitational force?
- d) Find the magnitude of the normal force
- e) Find the magnitude of the acceleration of the object
- f) If the block reaches the bottom of the plane in 2s, what is the final velocity of the block at the bottom of the inclined plane?

4. Johnny is pushing a 20kg block up a  $30^{\circ}$  frictionless ramp.



- a) Draw the free body diagram for the block
- b) What is the weight of the block?
- c) Calculate the components of the gravitational force
- d) What is the magnitude of the normal force?
- e) If he is pushing with 120 N, what is the magnitude of the acceleration of the block?

5. Calculate the variables (Normal Force, Net Force, and Acceleration) for the following scenarios:

