Name $\qquad$ Period $\qquad$

## Inclined Plane Problems

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 $0.5 \mathrm{~m} / \mathrm{s}^{2}$ in the direction of pulling?
2. A block of 15 kg is on a $45^{\circ}$ 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 5 kg is released from the top of an inclined plane of length of 1 m and an angle of $25^{\circ}$. 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 2 s , what is the final velocity of the block at the bottom of the inclined plane?
4. Johnny is pushing a 20 kg 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:


## Diagram B



