## Finding forces in real life situations, with vector decomposition and friction!

1. A 20 kg mass is allowed to accelerate down a *frictionless* 15° ramp.

|  |  |
| --- | --- |
|  | a. Draw a force diagram for the block.  b. Determine the value of the x-component of the force of gravity.  c. What is the acceleration of the block down the ramp?  d. How long will it take for the block to slide 30.0m? |

2. An applied 25 N force pushes on a 5.0 kg block resting on a *frictionless* horizontal surface. The force is directed downwards at an angle of 20°.



20º

a. Draw a force diagram for the block.

b. Determine the x-component of the applied force.

c. What is the acceleration of the block?

d. What is the normal force on the block?

3. A 70.0 kg box is pulled by a 400N force at an angle of 30.0° to the horizontal. The force of kinetic friction is 75.0 N. Draw the force diagram for the box.

What is the acceleration of the box?

4. A block is being pulled up a ramp as shown in the diagram below. Assume that the ramp is *frictionless*.



Draw the force diagram for the block on the ramp.

What is the x-component of the force of gravity acting on the block on the ramp?

What is the acceleration of the block?

5. Repeat problem 4, except now, assume that the frictional force acting on the block on the ramp is 25.0 N.