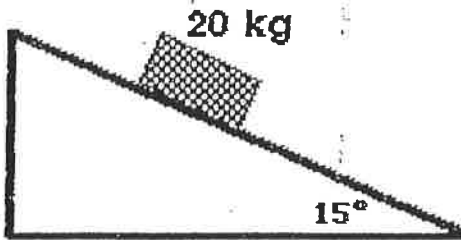
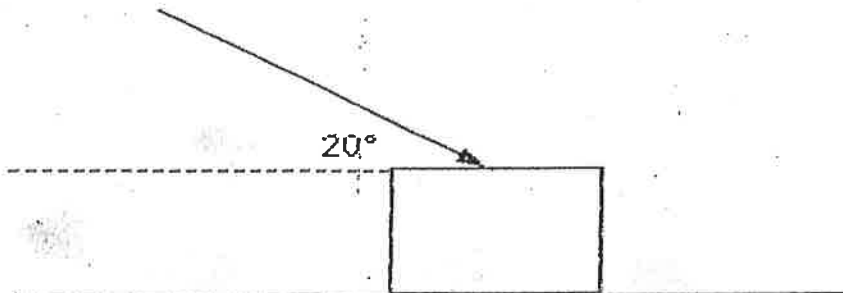


Force diagrams with acceleration

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

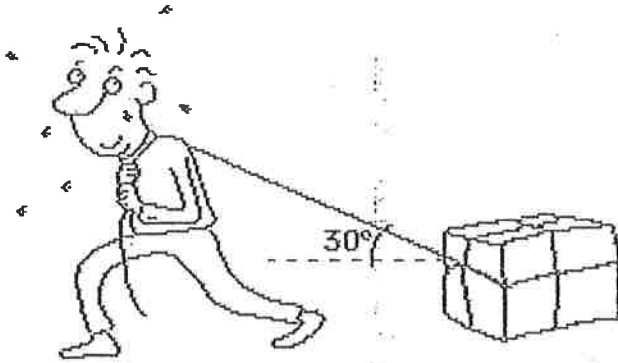


- Draw a force diagram for the block.
 - Determine the value of force of earth that causes the block to accelerate.
 - What is the acceleration of the block down the ramp?
 - Assuming the block starts from rest, how long will it take for the block to slide 30 m?
2. An applied 25 N force pushes on a 5.0 kg block resting on a *frictionless* horizontal surface. The force is directed downwards at an angle of 20° .



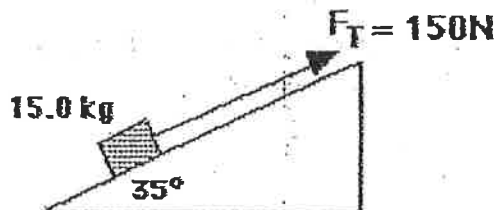
- Draw a force diagram for the block.
- Determine horizontal component of the applied force.
- What is the acceleration of the block?
- What is the normal force on the block?

3. A 70.0 kg box is pulled by a 400 N force at an angle of 30° 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 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 component of the force of earth acting against the tension force?

What is the acceleration of the block?

5. Repeat problem 4, except now, assume there is a frictional force acting on the block on the block which is 25.0 N.
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