

# #1 Forces: Acceleration, Normal Force, and Friction

Equations:  $F=ma$      $f = \mu F_N$     SOHCAHTOA

- 1) What is the weight of an object if it has a mass of 26.2kg?
- 2) What is the net force on an object if there is a 30.0N force pushing to the left and a 20.0N force pushing to the right?
- 3) What is the force applied to an object on a level frictionless surface if it has a mass of 362kg and is undergoing an acceleration of  $2.3\text{m/s}^2$ ?
- 4) What is the mass of an object if it accelerates at a rate of  $1.81\text{m/s}^2$  on a level frictionless surface when a force of 32.3N is applied to it?
- 5) What will the acceleration be in the x-direction and the y-direction if there is a 35.3N force pulling on a 3.8kg object at a  $23.8^\circ$  angle to the horizontal?
- 6) What is the force applied to an object at rest if it has a mass of 9.65kg and after pushing on a level frictionless surface for 3.82s, it has a velocity of 6.20m/s?
- 7) What is the normal force of a 25.3kg object that is sitting on a level surface? What would the normal force be if it was sitting on a  $10.0^\circ$  incline?
- 8) What force would be acting down the incline of a 41.3kg object on a frictionless  $22.8^\circ$  incline? What would its velocity be after 2.88s if it started from rest?
- 9) What is the force of friction if a 35kg object has a 150N force applied to it but is not moving? What would the coefficient of friction have to be?
- 10) What is the force of friction on an object on a level surface if the object has a mass of 82.5kg and the coefficient of friction is 0.140? What would its velocity be after 1.33s if it was pushed with a 130.N force?
- 11) What will the acceleration be for a 15.6kg object that is released at the top of a  $20.3^\circ$  incline that has a coefficient of friction of 0.110?

## Answers

- 1) 262N
- 2) 10.0N left
- 3) 830N
- 4) 17.8kg
- 5)  $3.8\text{m/s}^2$ ,  $8.5\text{m/s}^2$
- 6) 15.7N
- 7) 253N, 249N
- 8) 160N, 11.2m/s
- 9) -150N, 0.43
- 10) 116N, 0.226m/s
- 11)  $2.45\text{m/s}^2$