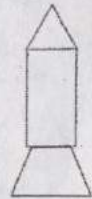


(Newton's 2nd law)

1. A rocket accelerating upward from the surface of the Earth has a mass of 8000 kg.

It has an upward acceleration of  $30 \text{ m/sec}^2$ .

a) What is the net force on the rocket?



b) Draw a force diagram (at right).  
Include the weight and the thrust force.

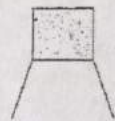
c) What is the thrust force on the rocket in newtons?

d) If the rocket leaves the ground initially at rest, what will the velocity of the rocket be 20 seconds after leaving the ground?

2. Someday in the future a 2000-kg craft will land on the surface of Mars where  $g = 4 \text{ m/sec}^2$ . The craft is currently descending to the surface at a speed of 50 m/sec. The craft will use a thrust force to slow down and come to a stop (and safe landing). The thrust force is 24,000 N.

a) What is the weight of the rocket?  
(Remember, this is not Earth.)

b) Draw a force diagram (at right).  
Include the weight and the thrust force.



c) Draw a motion diagram.

d) What is the acceleration of the craft?

e) How many seconds does it take for the craft to come to a stop?