Now that you have explored forces, gravity and free body diagrams, complete the activity below to exhibit your understanding of this topic. Be sure to completely answer each question and show all of your work.

1. For each of the diagrams below, determine the magnitude and direction of a single force that would make the net force on the object equal zero.

22 N

11 N

39 N

22N

18 N

35 N

16 N

17 N

19 N

17 N

10 N

18 N

22 N

14 N

19 N

8



7 N

9 N

8 N

4 N

5 N

8 N

4 N

3

18 N

22 N

4 N

24 N

31 N

21 N

34 N

8 N



1. Complete the following table about various objects on the surface of these objects in our solar system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Planet** | **mass of object** | **gravitational acceleration (g)** | **Weight of Object** |
| Earth | 24.1 kg | 9.8 m/s2 |  |
| Sun |  | 274 m/s2 | 48200 N |
| Mercury | 60 kg |  | 222 N |
| Pluto |  | 0.61 m/s2 | 219 N |
| Jupiter | 20 kg | 25.9 m/s2 |  |
| Moon | 27.0 kg |  | 44 N |
| Uranus |  | 9.01 m/s2 | 892 N |

1. Draw a free body diagrams for the underlined object in each situation below.
   1. A roller coaster is upside down as it rolls frictionless through a loop-de-loop.
   2. A hockey puck is being hit horizontally by a hockey stick on frictionless ice.
   3. A crate being pulled along a rough surface at a constant velocity with a horizontal rope.
   4. A piano being pushed up a frictionless ramp into a moving truck
   5. A cannonball that flies through the air after being shot from a cannon.