

Mass & Weight Problems

$g_{\text{earth}} = 10 \text{ m/s}^2$

$g_{\text{moon}} = 1.6 \text{ m/s}^2$

$g_{\text{mars}} = 3.7 \text{ m/s}^2$

$g_{\text{Jupiter}} = 24.8 \text{ m/s}^2$

1. What is the force of gravity on a person of mass 55 kg on the earth?
2. How much does a 75 kg person weigh on the earth?
3. How much would a 75 kg person weigh on the moon?
4. What is the mass of a person who weighs 950 N on the earth?
5. What is the mass of a person who weighs 140 N on the moon?
6. Object A weighs 100 N on the earth while Object B weighs 100 N on the moon.
 - a. Which has more mass?
 - b. Which would be more difficult to pick up and hold? Why?
 - c. Which would be more difficult to push sideways? Why?
7. How much would a container of milk that weighs 20 N on the earth weigh on Jupiter?
8. If a person weighs 1500 N on Jupiter, how much would they weigh on Mars?
- *9. An astronaut on a far away planet drops a 50 kg backpack from a height of 1.5 meters. It falls for 2.2 seconds. How much does the backpack weigh on that planet?

Answers:

1) 550 N

2) 750 N

3) 120 N

4) 95 kg

5) 87.5 kg

6. a) B

b) same; same weight

c) B; more mass

7) 49.6 N

8) 224 N

9) 31 N ($g = 0.62 \text{ m/s}^2$)