What is the weight of 76kg astronaut on earth? What is the weight of the astronaut on the moon (g = 1.67 m/s ^2)? What is the weight of the astronaut on mars (g= 3.6 m/s ^2)?

Solution.

$$m = 76kg, g_{Earth} = 9.8\frac{m}{s^2}, g_{Moon} = 1.67\frac{m}{s^2}, g_{Mars} = 3.6\frac{m}{s^2};$$

$$F_{Earth} - ? \; F_{Moon} - ? \; F_{Mars} - ?$$

The weight of astronaut on Earth:

$$F_{Earth} = mg_{Earth};$$

$$F_{Earth} = 76kg \cdot 9.8\frac{m}{s^2} = 744.8N.$$

The weight of astronaut on Moon:

$$F_{Moon} = mg_{Moon};$$

$$F_{Moon} = 76kg \cdot 1.67\frac{m}{s^2} = 130.26N.$$

The weight of astronaut on Mars:

$$F_{Mars} = mg_{Mars};$$

$$F_{Mars} = 76kg \cdot 3.6\frac{m}{s^2} = 273.6N.$$

Answer:

The weight of astronaut on Earth is $F_{Earth} = 744.8N$.

The weight of astronaut on Moon is $F_{Moon} = 130.26N$.

The weight of astronaut on Mars is $F_{Mars} = 273.6N$.