

### Answer on Question #69941, Physics / Other

Suppose you are visiting a planet in a distant part of the galaxy. To determine the acceleration due to gravity on this planet, you drop a small rock from a height of 55m. The rock strikes the ground 1.9s later. How many times greater is the acceleration due to gravity on this planet than on earth.

#### Solution:

The kinematic equation is

$$h = v_0 t + \frac{at^2}{2}$$

The initial velocity

$$v_0 = 0$$

The acceleration due to gravity is

$$a = \frac{2h}{t^2}$$

Substituting

$$a = \frac{2 \times 55 \text{ m}}{(1.9 \text{ s})^2} = 30.47 \text{ m/s}^2$$

The acceleration due to gravity at the surface of Earth is represented as g. It has a standard value defined as  $9.81 \text{ m/s}^2$ .

The acceleration due to gravity on this planet is

$$\frac{30.47}{9.81} = 3.1$$

times greater than on earth.

**Answer: 3.1**

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