

## Answer on Question 60701, Physics, Mechanics, Relativity

### Question:

A force exerted on an object produces an acceleration. If the mass is reduced by one-third, the acceleration is increased by a factor of...?

### Solution:

Let's recall the famous Newton's Second Law of Motion. It states that the acceleration of an object is directly proportional to the net force acting on it and is inversely proportional to its mass.

We can state the Newton's Second Law of Motion mathematically as follows:

$$F = ma,$$

here,  $F$  is the net force acting on the object,  $m$  is the mass of the object,  $a$  is its acceleration.

From this formula we can find the acceleration of the object:

$$a = \frac{F}{m}.$$

From the condition of the question we know that the mass of the object is reduced by one-third, so we have  $\frac{2}{3}m$ . Then, from the formula for the acceleration of the object we get:

$$a_{new} = \frac{F}{\frac{2}{3}m} = \frac{3F}{2m} = \frac{3}{2}a = 1.5a.$$

### Answer:

If the mass is reduced by one-third, the acceleration is increased by a factor of 1.5.