

1. Mass

a. Is the mass of a 2 kg block of lead twice as much as the mass of a 1 kg block of lead?

YES

b. Does it have twice the volume?

YES

c. Would its weight be twice as much, if they were weighed in the same location?

YES

d. Is the mass of a 2 kg lead block twice the mass of a 1 kg bunch of bananas?

YES

e. Can you compare the volumes? Why or why not?

No, there is not enough information—need to know density

f. Would the mass of the lead block be the same on the Moon?

YES

g. What about the weight?

No, MOON'S GRAVITY IS LESS, SO WEIGHT WILL BE LESS

2. Force

a. Find the net force produced by a 30 N force and a 20 N force if they are acting in the same direction:

$$30\text{ N} + 20\text{ N} = 50\text{ N}$$

b. Find the net force if the two forces are acting in opposite directions:

$$30\text{ N} - 20\text{ N} = 10\text{ N}$$

3. Speed

a. Calculate the average speed of a tennis ball if it travel 24 m, the full length of the court, in 0.5s: **all of these work—they all follow the rules of math**

$$\frac{24\text{m}}{0.5\text{s}} = 48\frac{\text{m}}{\text{s}}$$

$$\frac{24\text{m} \times 2}{0.5\text{s} \times 2} = \frac{48\text{m}}{1\text{s}}$$

$$\frac{24\text{m}}{\left(\frac{1\text{s}}{2}\right)} = \frac{24\text{m}}{1} \times \frac{2}{1\text{s}} = 48\frac{\text{m}}{\text{s}}$$

b. Calculate the speed of a runner who travels 4 km in 30 minutes:

i. In km/min

$$\frac{4\text{km}}{30\text{min}} = 0.13\frac{\text{km}}{\text{min}}$$

ii. In km/hr

$$\frac{4\text{km}}{30\text{min}} \times \frac{60\text{min}}{1\text{hr}} = 8\frac{\text{km}}{\text{hr}}$$

4. Acceleration

a. What is the acceleration of a ball rolling down a ramp, if it starts at rest, and gains the speed of 25 m/s in 5 s?

Find Δv :

$$25\frac{\text{m}}{\text{s}} - 0\frac{\text{m}}{\text{s}} = 25\frac{\text{m}}{\text{s}}$$

put into acceleration equation:

$$\frac{\left(25\frac{\text{m}}{\text{s}}\right)}{5\text{s}} = 5\frac{\text{m}}{\text{s}^2}$$

b. If a bicyclist traveling 5 m/s increases her speed to 7 m/s in 2 seconds, what is her acceleration?

Find Δv :

$$7\frac{\text{m}}{\text{s}} - 5\frac{\text{m}}{\text{s}} = 2\frac{\text{m}}{\text{s}}$$

Put into acceleration eq.

c. What is the acceleration of a car that changes speed from 28 m/s to 30 m/s in 2 seconds? **Same as b except speeds.**

$$\frac{\left(2\frac{\text{m}}{\text{s}}\right)}{2\text{s}} = 1\frac{\text{m}}{\text{s}^2}$$