Scalar quantities	Vector quantities
These quantities are completely described when you state their size. Remember that size can also be called **magnitude** and is usually given in terms of a numerical quantity.	To be completely described, these quantities must include information about both their **magnitude and their direction**.
distance - represented by **d** in formulas. Its preferred unit of measure in the SI system is meters (m). Distance represents the length of the path taken between two points.	**displacement** - represented by **s** in formulas. Its preferred unit of measure in the SI system is meters (m). Displacement represents the straight line distance between the starting point and the ending point and is independent of the actual path traveled.
time - represented by **t** in formulas. It represents the duration of an event and is measured in the SI system in terms of seconds (sec).	
speed - represented by **r** in formulas. Its preferred unit of measure in the SI system is m/sec. It represents the rate at which distance is being traveled. The algebra equation **d = rt** relates these three initial scalar quantities. Over an extended interval of time, **average speed is defined as the ratio of total distance traveled divided by total time**	**velocity** - represented by **v** in formulas. It is also measured in the SI system in terms of m/sec. However, it represents the ratio of displacement per unit time and involves a direction of motion. The algebra equation **s = vt** relates these two initial vector quantities. Over an extended interval of time, **average velocity is defined as the ratio of net displacement divided by total time**
mass - represented in formulas with the variable **m**. In the SI system, it is measured in kg and represents the quantity of matter present in an object. It is also a measure of an object's inertia; where inertia represents the resistance of an object to a change in its state of motion. When an object is moved from one location to another, its mass is an invariant, but its weight changes with the pull of gravity.	**weight** - represented by the product **mg** in formulas. In the SI system, this basic force is measured in newtons (nt, N) where 1 N = 1 kg m/sec^2. In this formula, **g** represents the gravitational field strength, or the strength of gravity at a given location. On the earth ■ The value of **g** at sea level is 9.81 m/sec^2. ■ An object's weight vector always points towards the center of the earth. ■ Objects can only be truly weightless if they are located at the center of the earth. ■ Objects experience apparent weightlessness when they are in a state of freefall.

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