Class Set

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Math Notes – Acceleration

Acceleration is a measure of a change in velocity. Acceleration is speeding up, slowing down, and turning. You have to compare two velocities over time to calculate acceleration.

$$\textit{Acceleration} = \frac{\text{Velocity (final)} - \text{Velocity (initial)}}{\text{time of change}} \quad \text{or} \quad \frac{Vf - Vi}{\text{time}}$$

***units* = meters/second^2**

Example 1: A car passed another car, changing from 10 m/s to 15 m/s in 5 seconds. What is the car's acceleration?

Notes: Vf = 15 m/s
Vi = 10 m/s
Time = 5 s

Our formula is: $\frac{15 - 10}{5}$ This reduces to: $\frac{5 \text{ m/s}}{5 \text{ s}}$ and equals: 1 m/s^2

In words, the car's acceleration is 15 m/s -10 m/s divided by 5 seconds , or 15-10 / 5, or 5 / 5, or 1 m/s^2.

The answer = 1 m/s^2

Example 2: A marble accelerates down a ramp in 2.5 seconds, reaching the bottom traveling 1.5 m/s. What was the marble's acceleration down the ramp?

Velocity (initial) = 0 m/s *Note: this is because the marble started from rest*
Velocity (final) = 1.5 m/s down the ramp

Acceleration = 1.5 m/s – 0 m/s / 2.5 seconds = 0.6 m/s^2

********** **For Review – Copy as Needed** **********

Speed is a measure of an object in motion. It is calculated by dividing distance by time:

$$\textit{speed} = \frac{\text{Distance (m)}}{\text{time (s)}} \quad \textit{units} = \text{meters/second}$$

Example: A runner runs 100 meters in 50 seconds. Her speed = 100 m / 50 s, or 2 m/s. Could she have been going around a track in a circle? **YES**

Velocity is calculated the same way as speed. Velocity is speed *plus* direction.

Example: A baseball was hit towards second base and traveled 50 meters in 1 second. Its velocity = 50 m / 1 s, or 50 m/s towards 2nd base. This is velocity - motion in one direction. Could the baseball have been going in a circle? **NO**