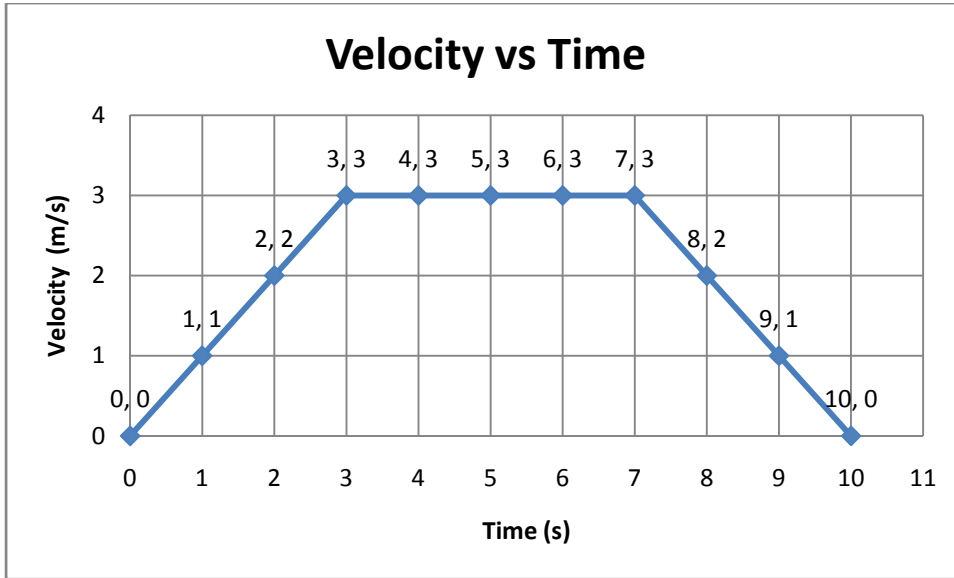


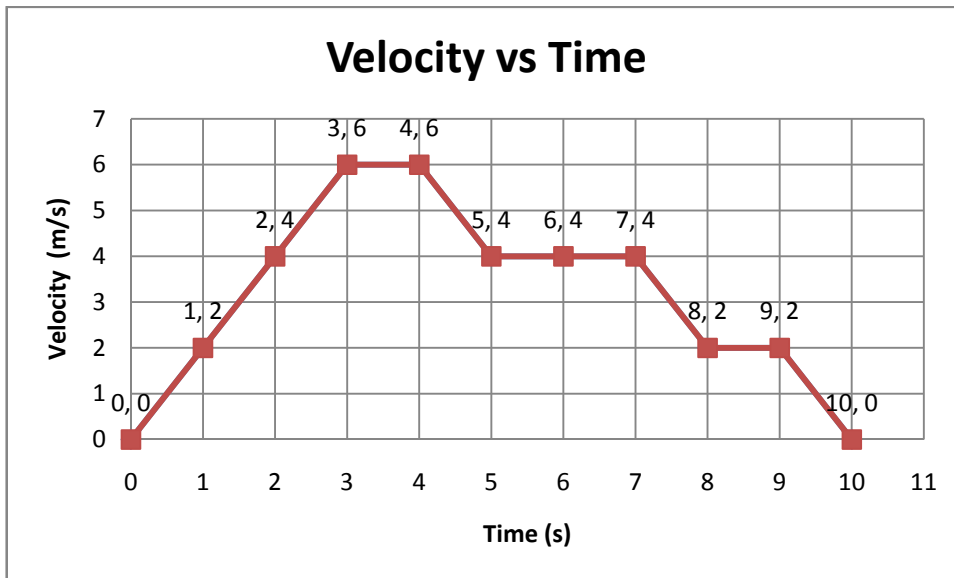
### Area Under Curves

Explain what happens in each of these graphs. What is the area under each of the curves? What does it show?

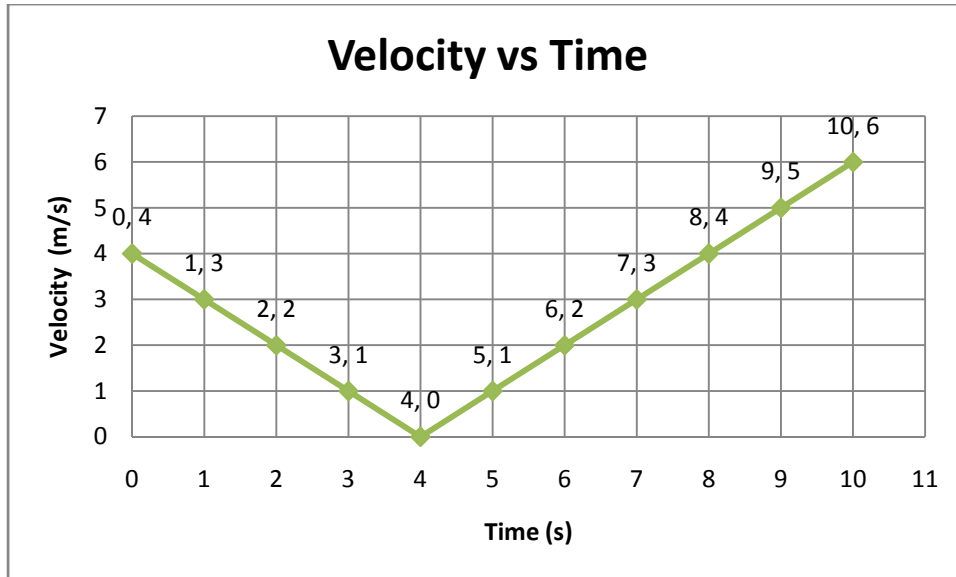
1.



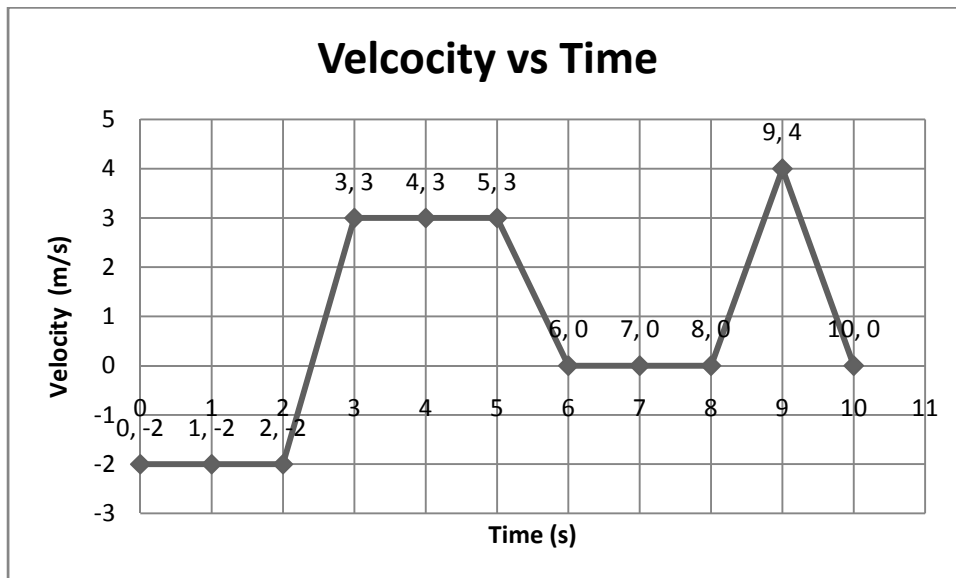
2.



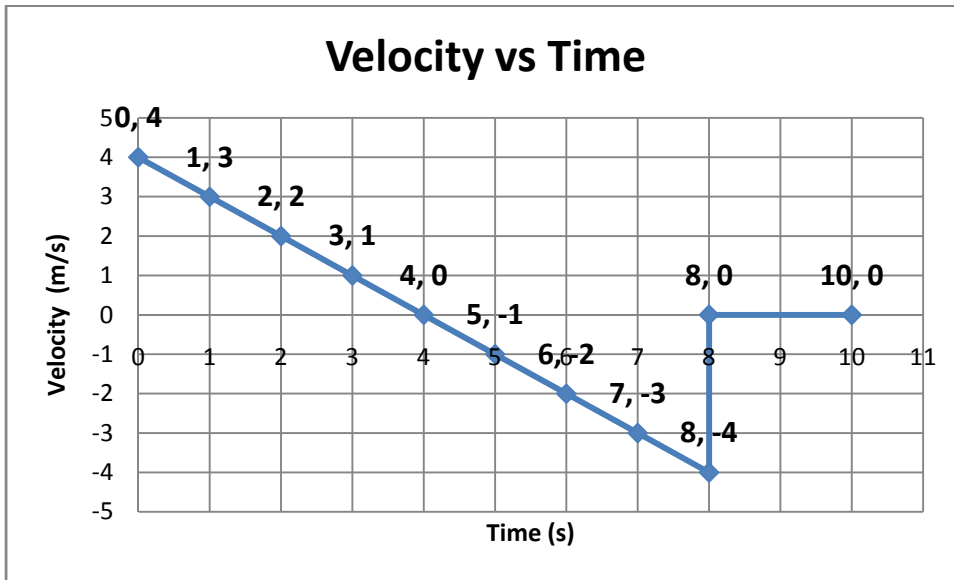
3.



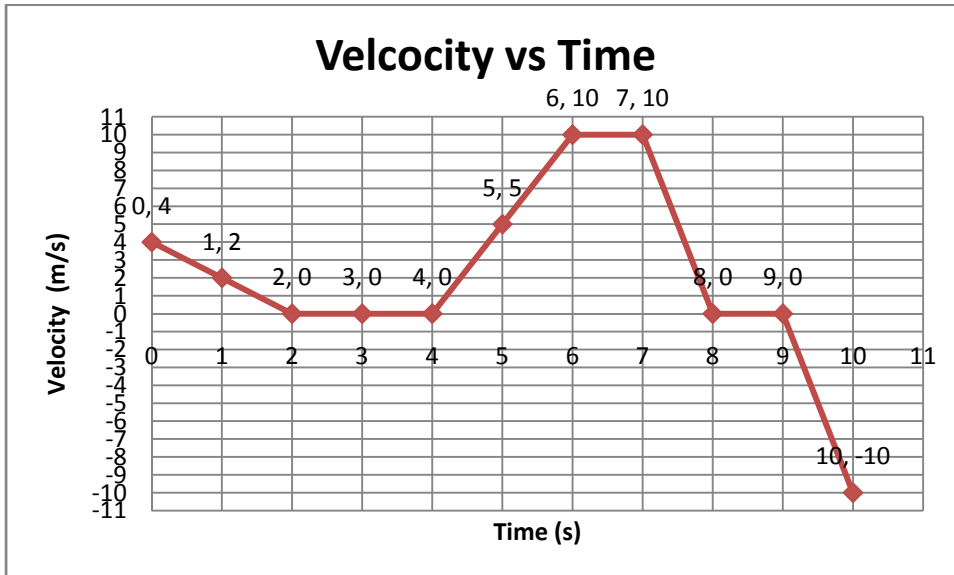
4.



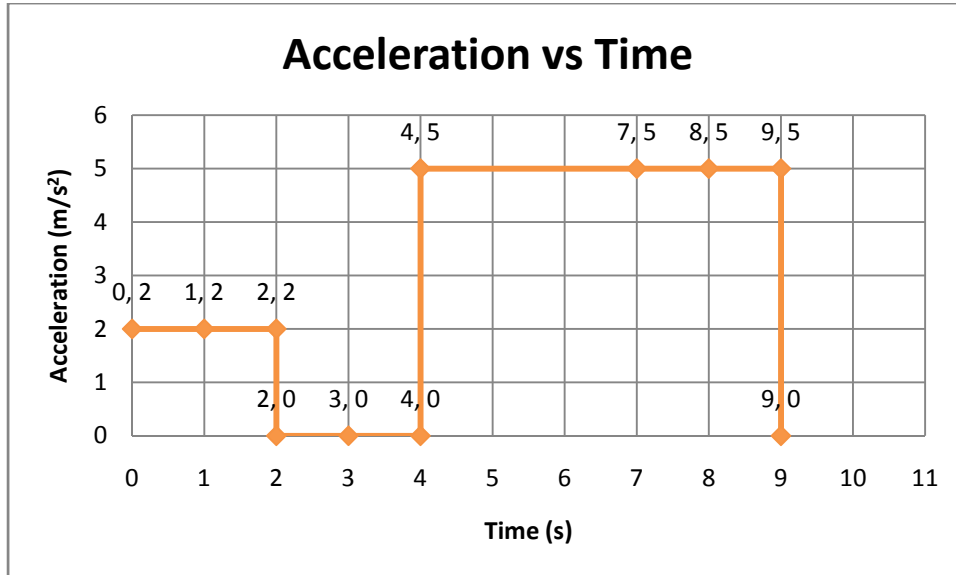
5.



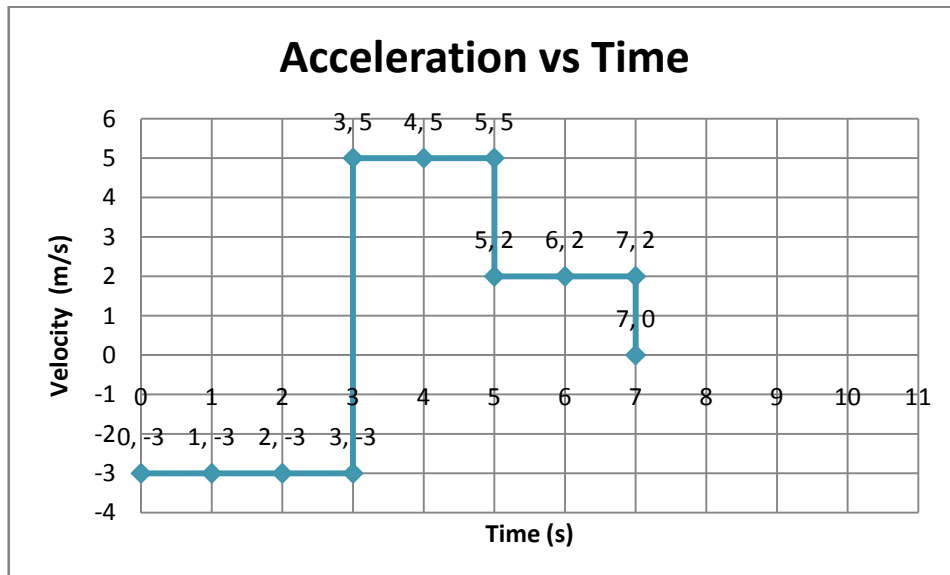
6.



7.



8.



**What the terms mean:**

**Average Velocity:**

$$\bar{v} = \frac{\Delta x}{\Delta t} = \frac{\text{displacement}}{\text{time interval}}$$

**Instantaneous Velocity:**

v = slope of the tangent line to an **x vs. t** plot.

**Average Acceleration:**

$$\bar{a} = \frac{\Delta v}{\Delta t} = \frac{\text{change in velocity}}{\text{time interval}}$$

**Instantaneous Acceleration:**

a = slope of the tangent line to a **y vs. t** plot.

**position (x)** – location of object, usually specified on an x-y coordinate system.

**displacement ( $\Delta x$ )** – change in position, *regardless* of the path taken; usually the straight line path length from start to finish.

**velocity (v)** – change in position (displacement) per time interval.

**acceleration (a)** – change in velocity per time interval.

**tangent** – intersects an established curve at a single point only.

**average** – during a time interval ( $\Delta t$ ).

**instantaneous** – at a specific moment in time (t).

**Slope of a line:**  $m = \frac{\Delta y}{\Delta x}$   
**Equation of a line:**  $y = mx + b$