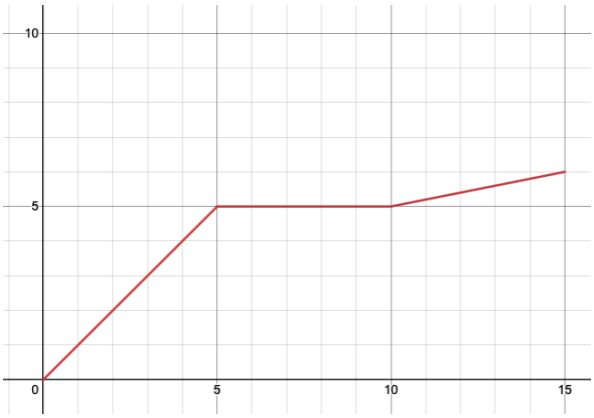
Calculus 1.5 Key Points

Position and Velocity:

Position: The location of an object - Units include meters (m), feet (ft), miles (mi)
Velocity: The rate of change of position - Units include meters per second ($\frac{m}{s}$), feet per minute ($\frac{ft}{min}$), miles per hour ($\frac{mi}{h}$)

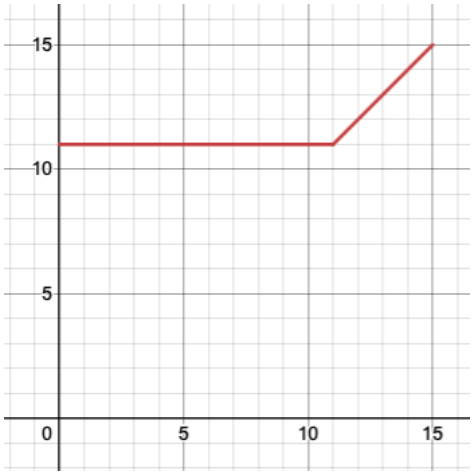
The velocity of an object can be determined by the position graph's slope.



In the distance graph to the right, since the graph has a slope of 1 between $t = 0$ and $t = 5$, we know that the object was traveling at a velocity of 1 during that time. Likewise, can figure out that the object's velocity between $t = 10$ and $t = 15$ was 0.2

Also, since the graph is flat between $t = 5$ and $t = 10$, we know that the object was not moving during that time.

The distance that an object traveled can be determined by the area under the curve of a velocity graph.



In the velocity graph to the right, the object was traveling at a velocity of 11 feet per second for the first 10 seconds, so it traveled $11 \bullet 10 = 110$ feet during that period. Notice how we determined the distance traveled by find the area between the velocity graph and the x-axis.

We can do the same between 11 and 15 seconds. The area of the trapezoid is $\frac{4\bullet(11+15)}{2} = 52$. Adding up the distance traveled between these two intervals $(110 + 52)$ gives us the total distance traveled, 162 feet.

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