Visualization of Multiplication

Visualization:

Conclusion: We can visualize multiplication of as a rectangle of height and width .

Example: If we travel at a velocity of for 3 seconds, how far did we travel?

Solution:

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |
| (ft/s) |  |  |  |  |

How far did the runner travel from to ?

Overestimate:

Underestimate:

How far did the runner travel from to ?

Overestimate:

Underestimate:

How far did the runner travel from to ?

Overestimate:

Underestimate:

How far did the runner travel from to ?

Overestimate:

Underestimate:

How do we get a better estimate?

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |  |  |  |
| (ft/s) |  |  |  | **11** |  |  |  |

How far did the runner travel from to ?

Overestimate:

Underestimate:

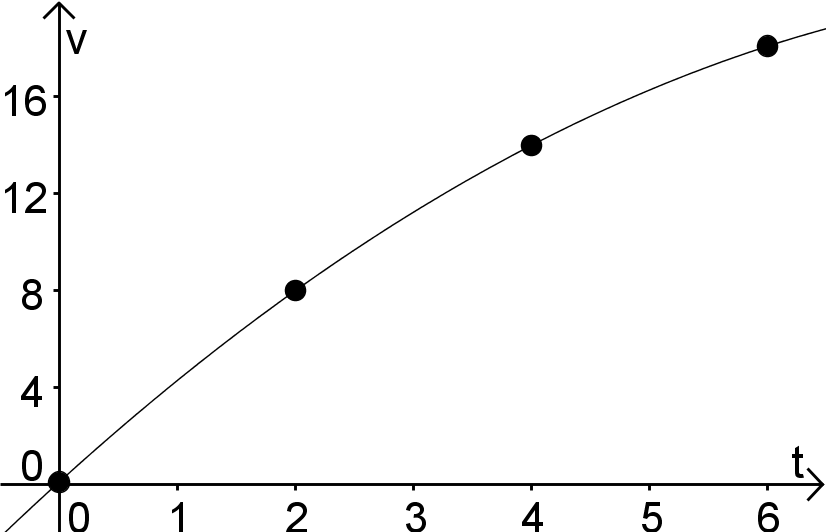
Note: If we want our approximation to be a number, average the over- and under-estimates.

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |
| (ft/s) |  |  |  |  |

How far did the runner travel from to ?

Overestimate:



Visualization of Multiplication:

Distance Travelled from

Distance Travelled from

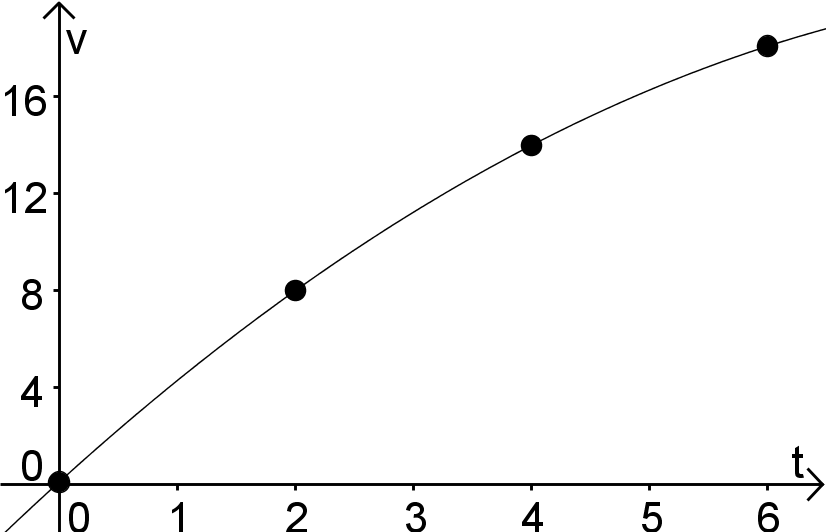
Distance Travelled from

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |
| (ft/s) |  |  |  |  |

How far did the runner travel from to ?

Underestimate:



Visualization of Multiplication:

Distance Travelled from

Distance Travelled from

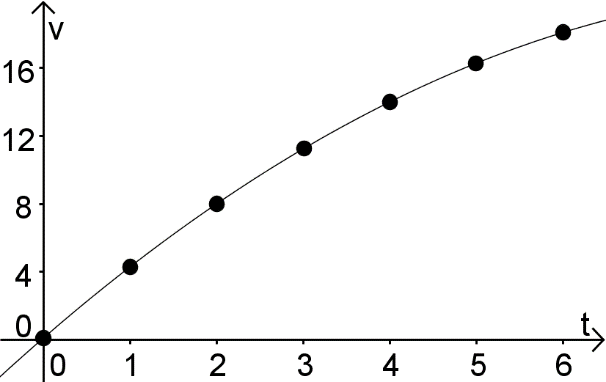
Distance Travelled from

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |  |  |  |
| (ft/s) |  |  |  | **11** |  |  |  |

How far did the runner travel from to ?

Overestimate:



Visualization of Multiplication:

Dist Travelled from

Dist Travelled from

Dist Travelled from

Dist Travelled from

Dist Travelled from

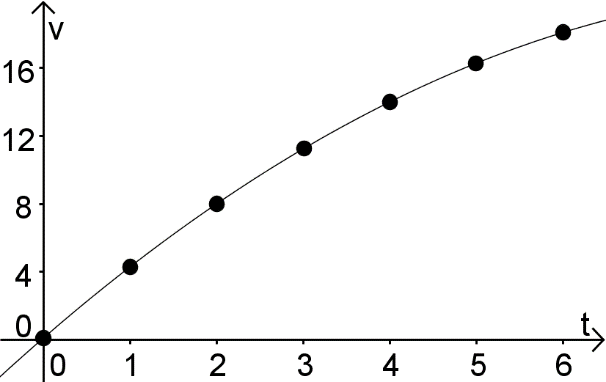
Dist Travelled from

Example: Velocities (in ft/sec) of a runner starting a race are:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **(sec)** |  |  |  |  |  |  |  |
| (ft/s) |  |  |  | **11** |  |  |  |

How far did the runner travel from to ?

Underestimate:



Visualization of Multiplication:

Dist Travelled from

Dist Travelled from

Dist Travelled from

Dist Travelled from

Dist Travelled from

Dist Travelled from

How far did the runner travel from to ?

Overestimate: The runner travelled at most feet in seconds.

Underestimate: The runner travelled at least feet in seconds.

How do we get a better estimate?

Notes from Graphs:

1.

2.

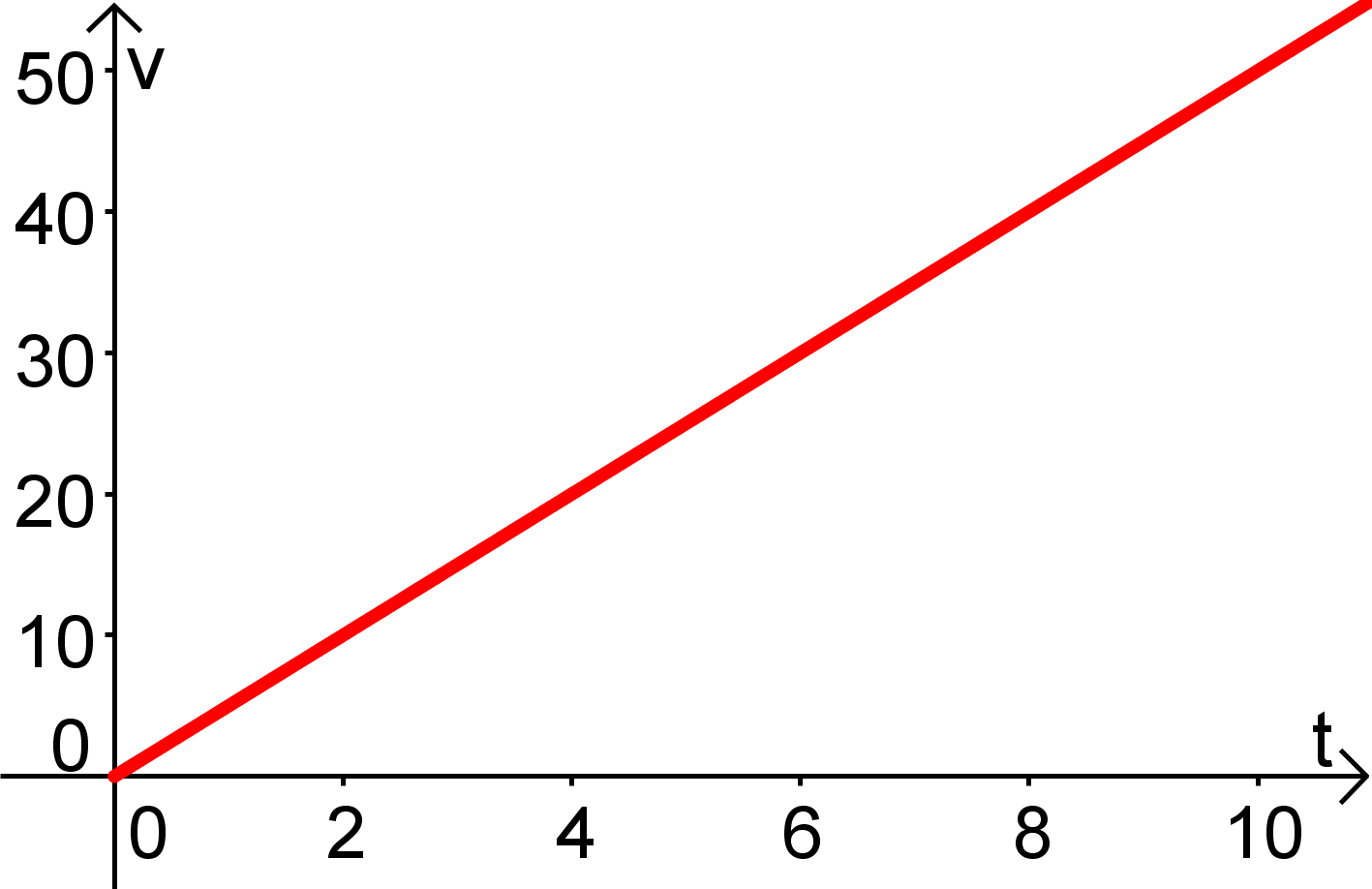
3.

;

Example: Suppose that a car’s velocity, given is feet/sec, is:

How far does the car travel in the first 10 seconds?

Solution:

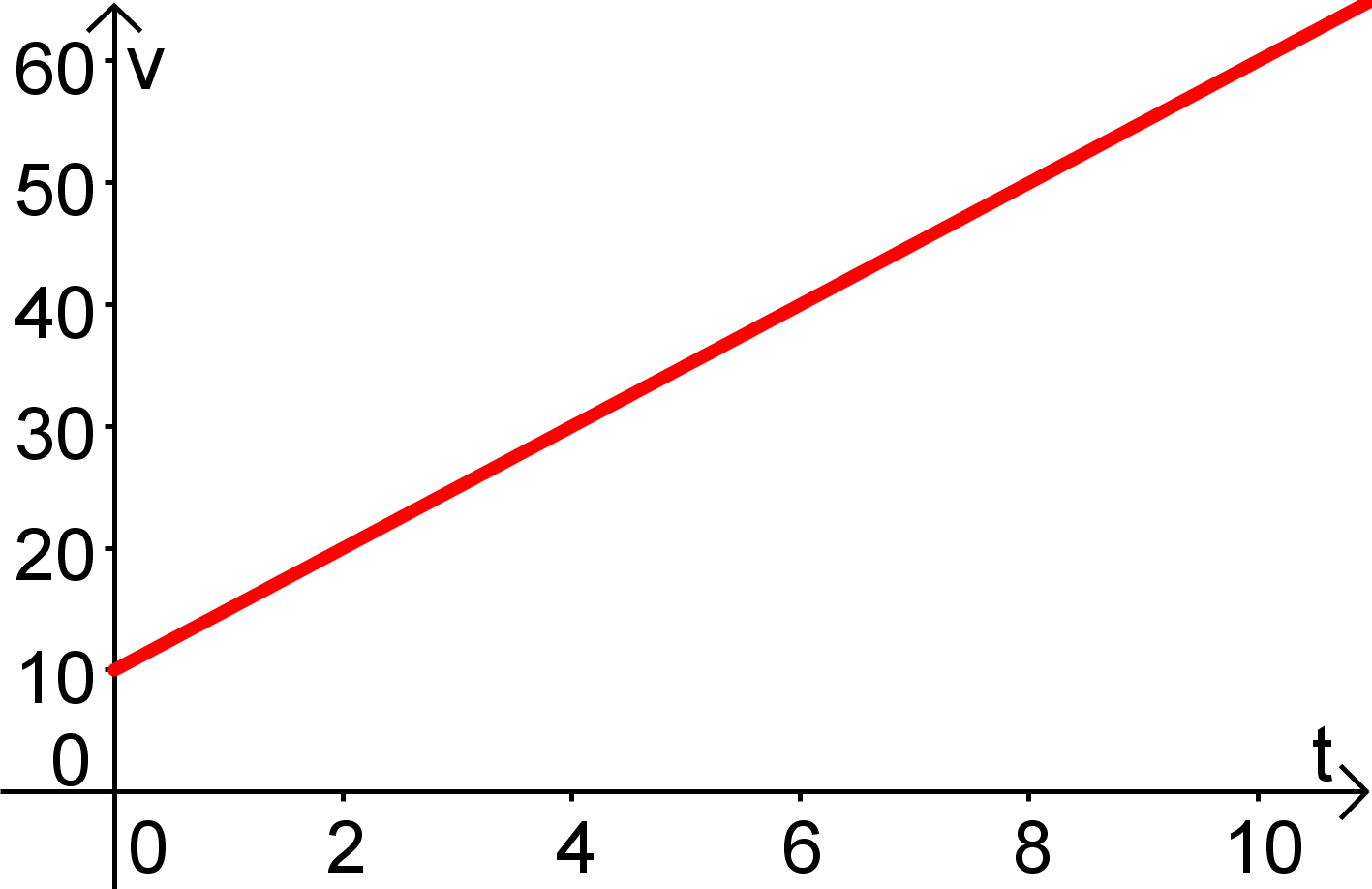


Conclusion:

Example 2: Suppose that a car’s velocity, given is feet/sec, is:

How far does the car travel in the first 10 seconds?

Solution:



Conclusion: