Acceleration

WHAT IS IT?

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Acceleration – Change in velocity divided by the time interval in which the change occurred.

Any _change in velocity results in an acceleration.

THIS INCLUDES JUST A CHANGE IN _direction_

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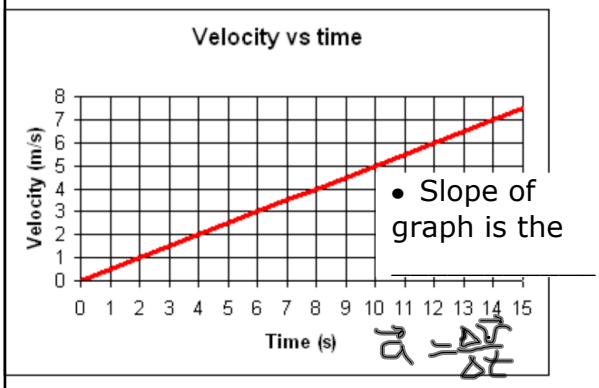
Graph of Acceleration



- Slope of graph is the _____

$a = \frac{\Delta v}{\Delta t}$

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- Constant _ Acceleration – the acceleration of a body does not change.
- Average acceleration - the acceleration of a body over a time __interval_____.
- Instantaneous acceleration - value at that _moment_____.
  - Will work with constant acceleration only

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$$\text{Acceleration} = \frac{(\text{initial velocity} - \text{final velocity})}{\text{time}}$$

$$a = \frac{(\_Vf\_ - \_vi)}{t}$$

Units of (_m_/s)/s or _ft_/s/s

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Acceleration example

A car goes from _5_ m/s to _2_ m/s in 20 s. Find the average acceleration of the car.

Given: $v_i = 5\text{m/s}$ $v_f = 2\text{m/s}$ $t = 20\text{ s}$

Equation : $a = \frac{(v_f - v_i)}{t}$

Solve : $a = \frac{(2-5)}{20s} = \frac{-3}{20} = -0.15\ \text{m/s}^2$

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Using Acceleration

- For objects undergoing _____ acceleration, the velocity will increase in linear amounts each second but the position of the object won't.
- Position _____ as a quadratic amount
- This happens due to the _____ change in velocity.

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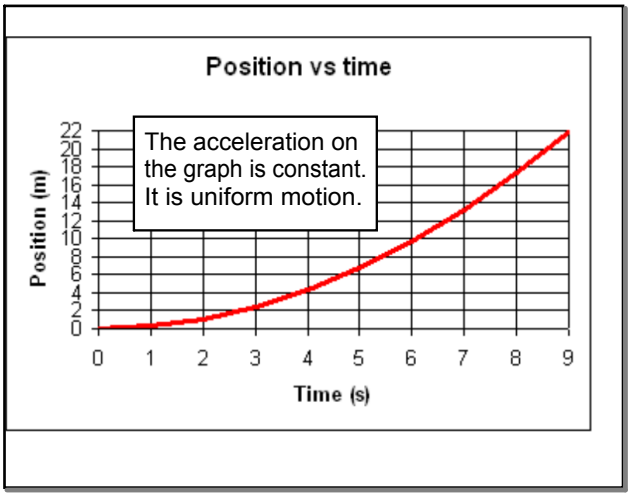

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$v = \_\_/t$ $a = (v_f - \_\_) / t$

- Equations to use only if acceleration is _____

$v_f = v_i + \_\_t$ $x = ½ (\_\_\_\_ + v_f)t$

$x = \_\_\_\_t + ½ \_\_t^2$

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Example Problem 1

Ima Hurryin is approaching a stoplight moving with a velocity of _____ m/s. The light turns yellow, and Ima applies the brakes and skids to a _____.

- If Ima's acceleration is -8.00 m/s^2 , how _____ does it take Ima to stop?
- Determine the _____ of the car during the skidding process.

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- How long does it take Ima to stop?

Given : a = _____ v_f = _____

v_i = _____ t = ?

Equation: $a = (v_f - v_i) / t$ $t = (v_f - v_i) / a$

Solve : $t =$ _____

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Determine the displacement of the car during the skidding process.

Given : a = _____ v_f = _____

v_i = _____ t = _____ x = ?

Equation: $x = v_i t + ½ a t^2$

Solve :

x =

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Ben Rushin is waiting at a stoplight. When it finally turns green, Ben accelerated from ___ at a rate of a 6.00 m/s^2 for _____ seconds.

- Determine the _____ of Ben's car during this time period.
- How fast is Ben going after this ____?

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Determine the _____ of Ben's car during this time period.

Given : t =___ a =_____ v_i =_____

x = ?

Equation: $x = v_i t + ½ a t^2$

Solve: x=

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How _____ is Ben going after this time?

Given : t =_____ a = _____

v_i =_____ v_f = ?

Equation: $a = (v_f - v_i) / t$ $v_f = v_i + at$

Solve: v_f =

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