Motion Equations 1

Objectives
Be able to use these formulas:

$$a = \frac{v_f - v_i}{\Delta t}$$

$$v_f = v_i + a \cdot \Delta t$$

Note that both of these formulas are the *definition of acceleration*, and it is simply put into two different forms

- Know that when an object is falling down, it accelerates at a rate of 9.8 $m/s^2$. Use this information the two formulas above.

Use the following formula only to solve for

*Formula 1:*

$$v_f = v_i + a \cdot \Delta t$$

I have an initial velocity of 4 m/s.
I have an acceleration of 5 m/s$^2$.
I have a time of 4 seconds.
What is my final velocity?

| Looking For | Formula | |
|---|---|---|
| Already Know | | |
| Answer in a complete sentence *with unit*: | | |

I have an initial velocity of 18 m/s.
I have an acceleration of 2 m/s$^2$.
I have a time of 20 seconds.
What is my final velocity

| Looking For | Formula | |
|---|---|---|
| Already Know | | |
| Answer in a complete sentence *with unit*: | | |

?

I have an acceleration of 3 m/s$^2$.
I have a time of 4 seconds.
I have a **final** velocity of 20 m/s.
What is my **initial** velocity?

| Looking For | Formula | |
|---|---|---|

| | |
|---|---|
| Already Know | |
| Answer in a complete sentence *with unit*: | |

I have an acceleration of 3 $m/s^2$.
I have a time of 4 seconds.
I have a **final** velocity of 20 m/s.
What is my **initial** velocity?

| Looking For | Formula |
|---|---|
| Already Know | |
| Answer in a complete sentence *with unit*: | |

I have a final velocity of 30 m/s.
I have an initial velocity of 20 m/s.
I have a time of 5 seconds.
What is my acceleration?

| Looking For | Formula |
|---|---|
| Already Know | |
| Answer in a complete sentence *with unit*: | |

I have a final velocity of 23 m/s.
I have an initial velocity of 5 m/s.
I have a time of 6 seconds.
What is my acceleration?

| Looking For | Formula | |
|---|---|---|
| Already Know | | |
| Answer in a complete sentence *with unit*: | | |

*Formula 2:*

$$\Delta x = v_i \cdot \Delta t + \frac{1}{2} a(\Delta t)^2$$

I have an initial velocity of 4m/s.
I have a time of 3 s.
I have an acceleration of 6 s.
What is my displacement?

| Looking For | Formula | |
|---|---|---|
| Already Know | | |
| Answer in a complete sentence *with unit*: | | |

I have an initial velocity of 5 m/s.
I have a time of 10 s.
I have an acceleration of 4 $m/s^2$.
What is my displacement?

| Looking For | Formula | |
|---|---|---|

| | |
|---|---|
| Already Know | |
| Answer in a complete sentence *with unit*: | |

*Formula 3*

$$\Delta x = \left(\frac{v_i + v_f}{2}\right)\Delta t$$

I have an initial velocity of 15 m/s.
I have a final velocity of 5 m/s.
I have a time of 3 seconds.
What is my displacement?

| Looking For | Formula |
|---|---|
| Already Know | |
| Answer in a complete sentence *with unit*: | |

I have an initial velocity of 3 m/s.
I have a final velocity of 13 m/s.
I have a time of 4 s.
What is my displacement?

| Looking For | Formula |
|---|---|
| Already Know | |

| | |
|---|---|
| | |
| Answer in a complete sentence *with unit*: | |

I have an initial velocity of 2 m/s.
I have a final velocity of 10 m/s.
I have a displacement of 48 m.
What was my time?

| | |
|---|---|
| Looking For | Formula |
| Already Know | |
| Answer in a complete sentence *with unit*: | |

I have an initial velocity of 12 m/s.
I have a final velocity of 18 m/s.
I have a displacement of 90 m.
What was my time?

| | |
|---|---|
| Looking For | Formula |
| Already Know | |
| Answer in a complete sentence *with unit*: | |