

IB Physics Bell Work, March 2 - 5, 2015

Physics: Instantaneous Velocity, Average Velocity, Constant Acceleration, Kinematic Equations, Motion Maps of Uniform Acceleration

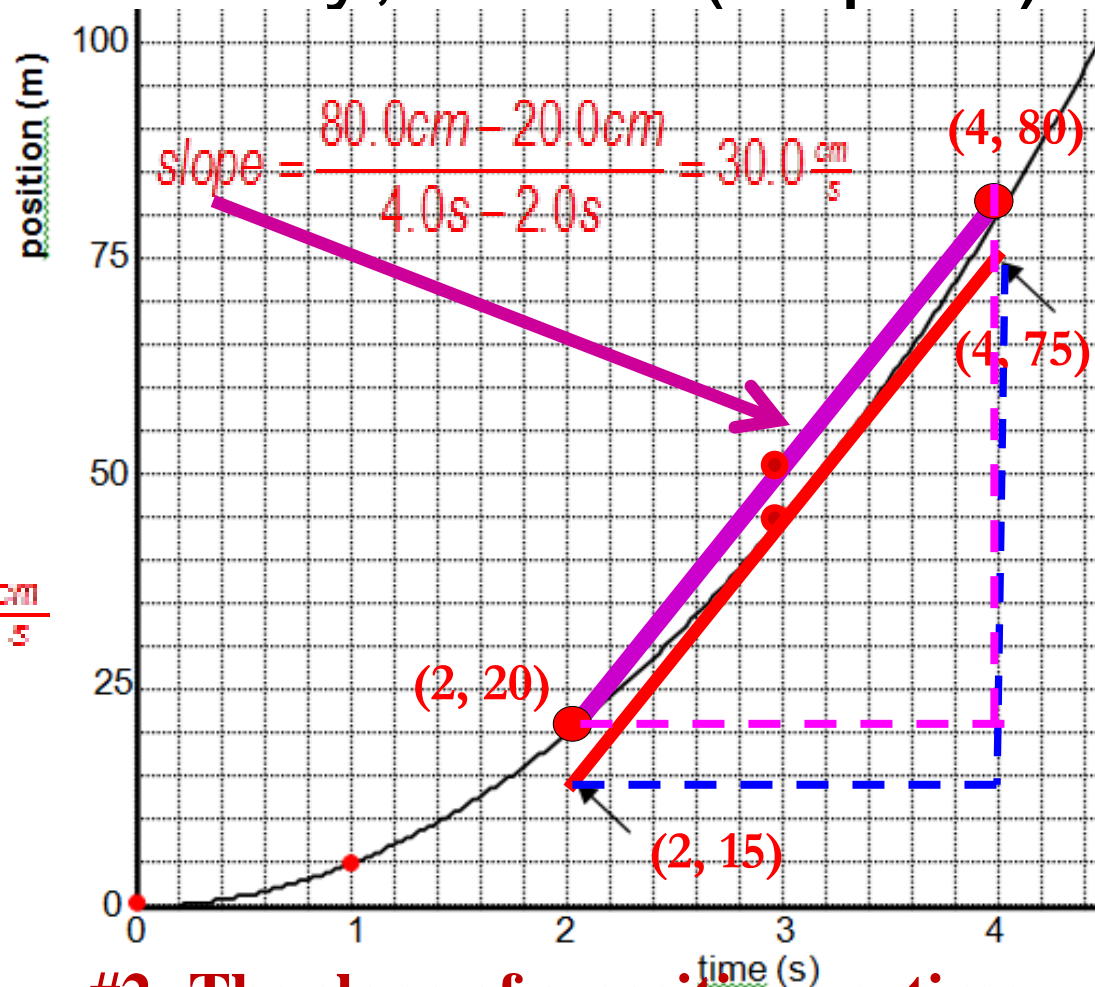
IB Physics Bell Work, Monday, Mar 2 (4 ques)

1. Draw a line tangent to the graph at $t = 3.0$ s.
2. Calculate the slope of this tangent line. Compare average & instantaneous velocity.

$$\text{slope} = \frac{75.0\text{cm} - 15.0\text{cm}}{4.0\text{s} - 2.0\text{s}} = 30.0 \frac{\text{cm}}{\text{s}}$$

3. Explain what the slope of tangent line tells you about the motion of the object.

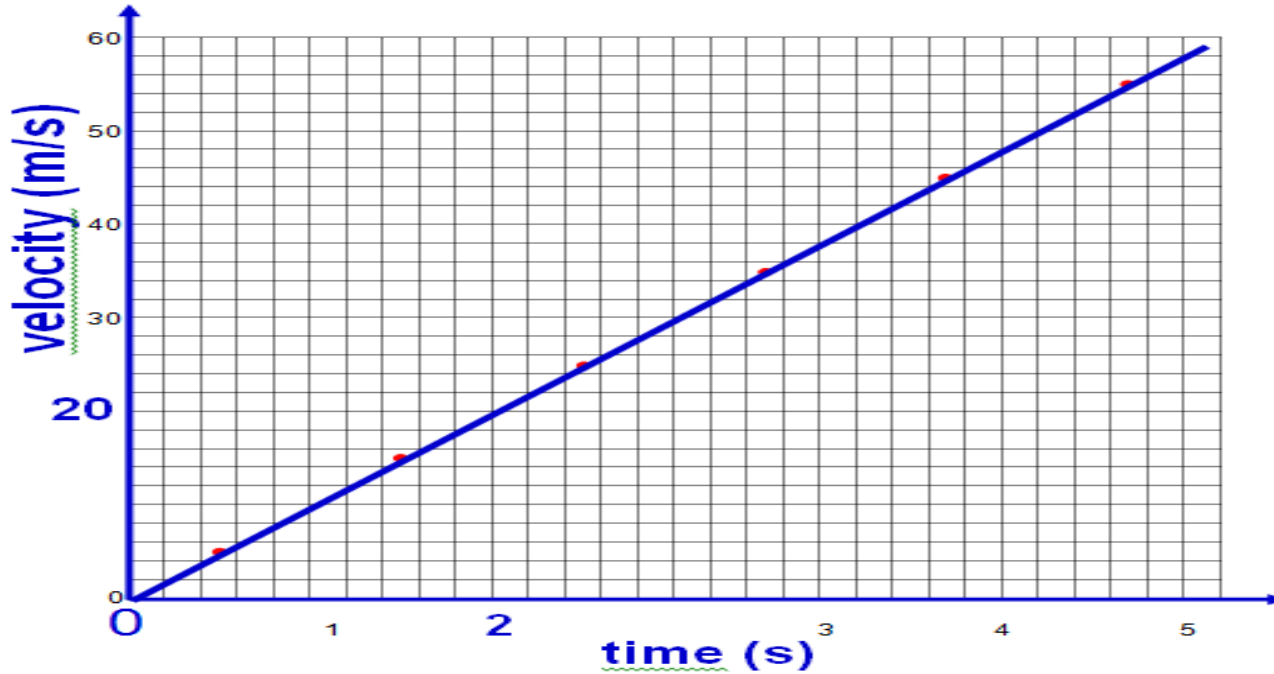
This slope of the tangent line tells us that the instantaneous velocity at the 3s clock reading is 30.0cm/s .



#2: The slope of a position vs. time graph is the average velocity if the slope is over a time interval. If it is the slope at a point it is the instantaneous velocity.

Physics Bell Work. Tues. Mar 3 (3 ques.)

Sketch the graph.



1. What does this graph tell you about velocity?

The velocity is increasing at a constant rate with time.

2. Calculate the slope of this v-t graph.

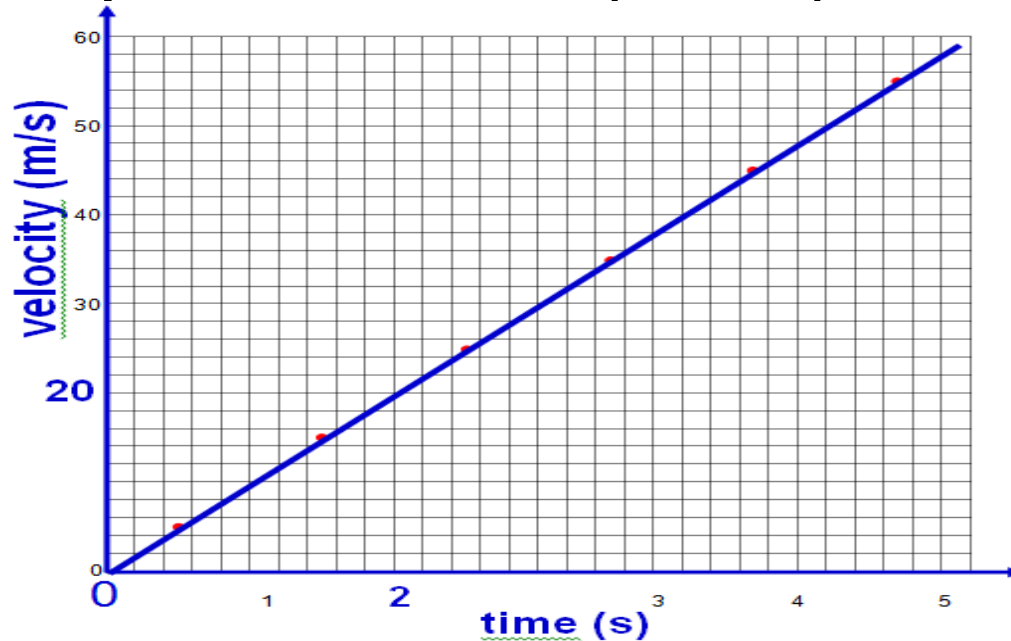
$$\frac{(20-0) \frac{m}{s}}{(2-0) s} = 10 \frac{\frac{m}{s}}{s}$$

3. What are the units of this slope?

Meters per second per each second

$$\frac{\frac{m}{s}}{s} = \frac{\frac{m}{s}}{\frac{s}{1}} = \frac{m}{s} \cdot \frac{1}{s} = \frac{m}{s^2}$$

IB Physics Bell Work, Tues, Mar 3

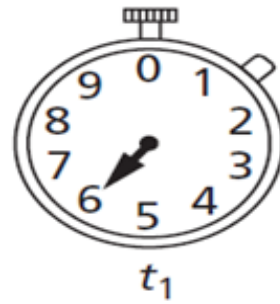
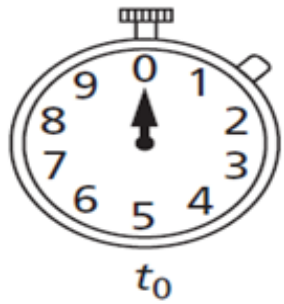


4. What is the significance of the slope of this v-t graph?

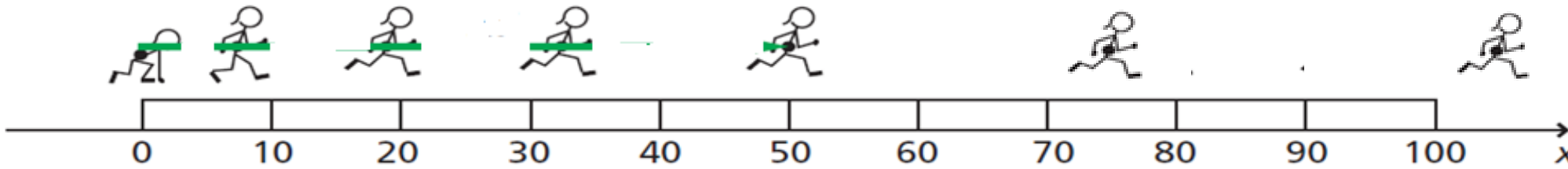
The slope, m , = $\frac{\Delta v}{\Delta t} = a$, acceleration

Because the slope is constant, the acceleration is constant or uniform.

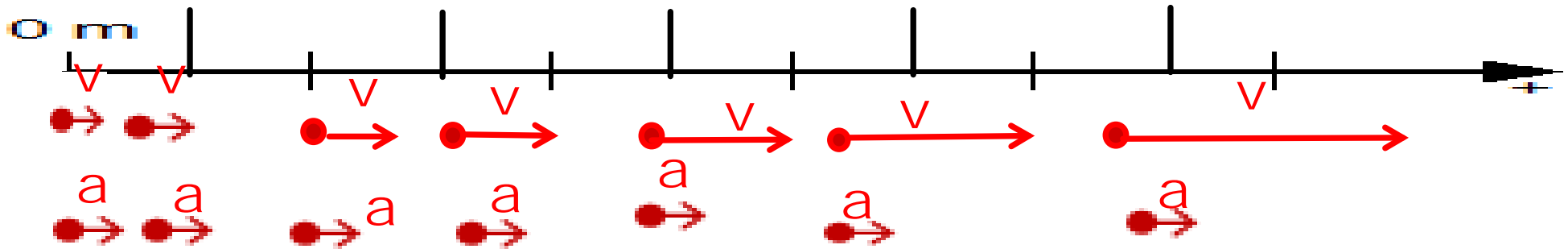
IB Physics Bell Work Thursday, Mar 4, 2015



$$\Delta t = 1 \text{ s}$$

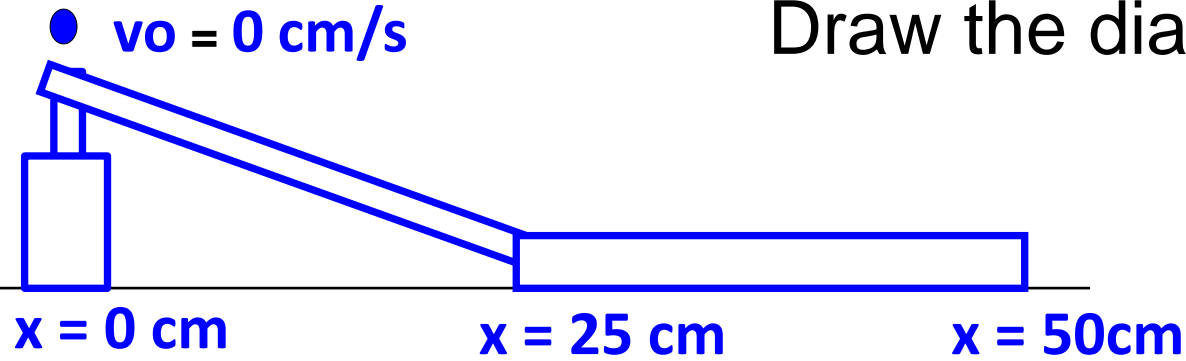


1. Draw a motion map for the runner shown above showing that velocity is not constant but acceleration is uniform .

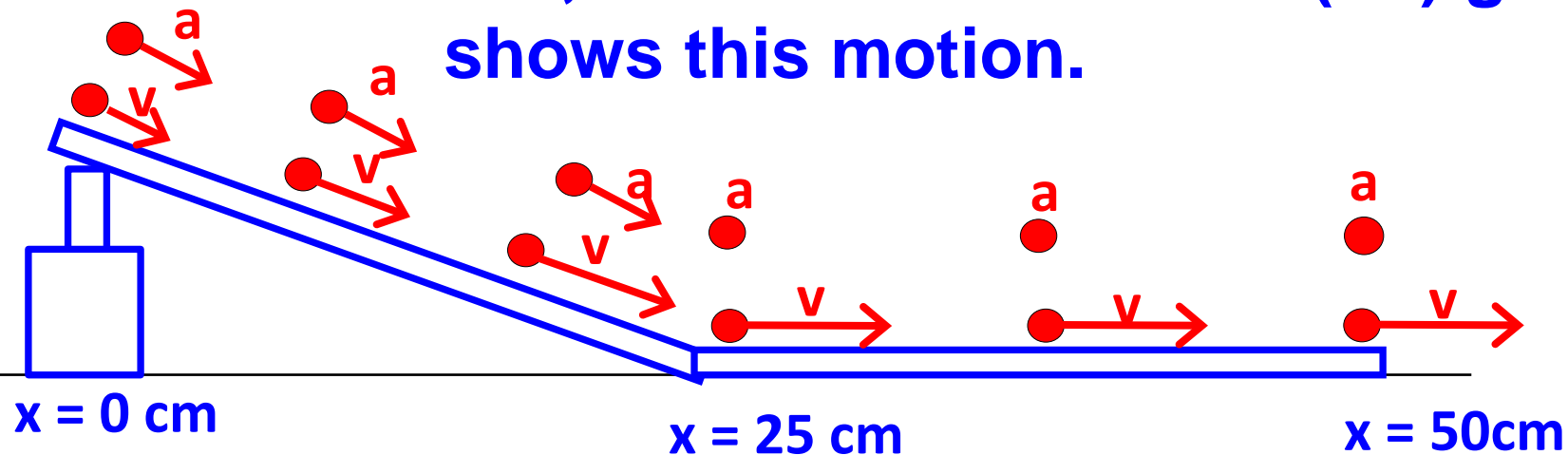


IB Physics Bell Work Wednesday, Feb 25, 2015

Draw the diagram

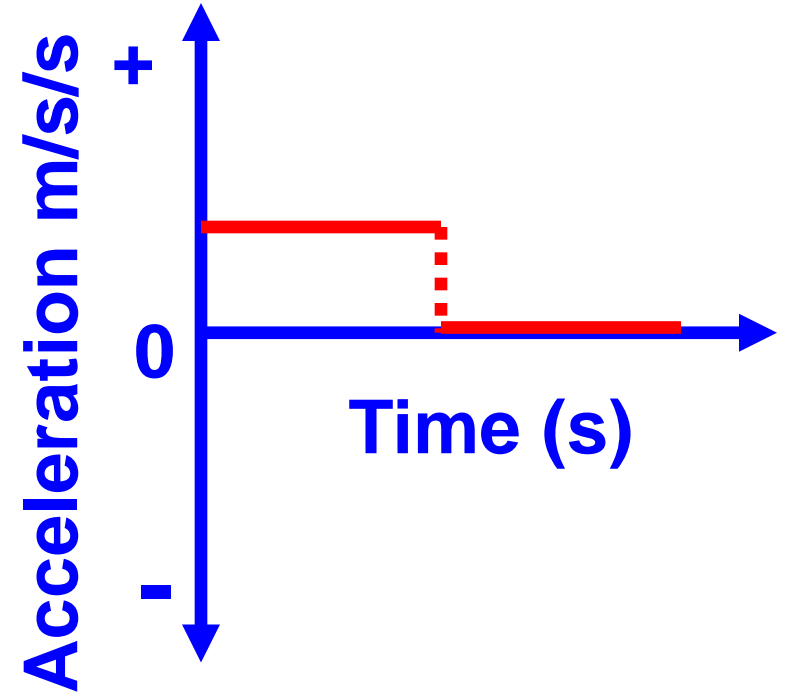
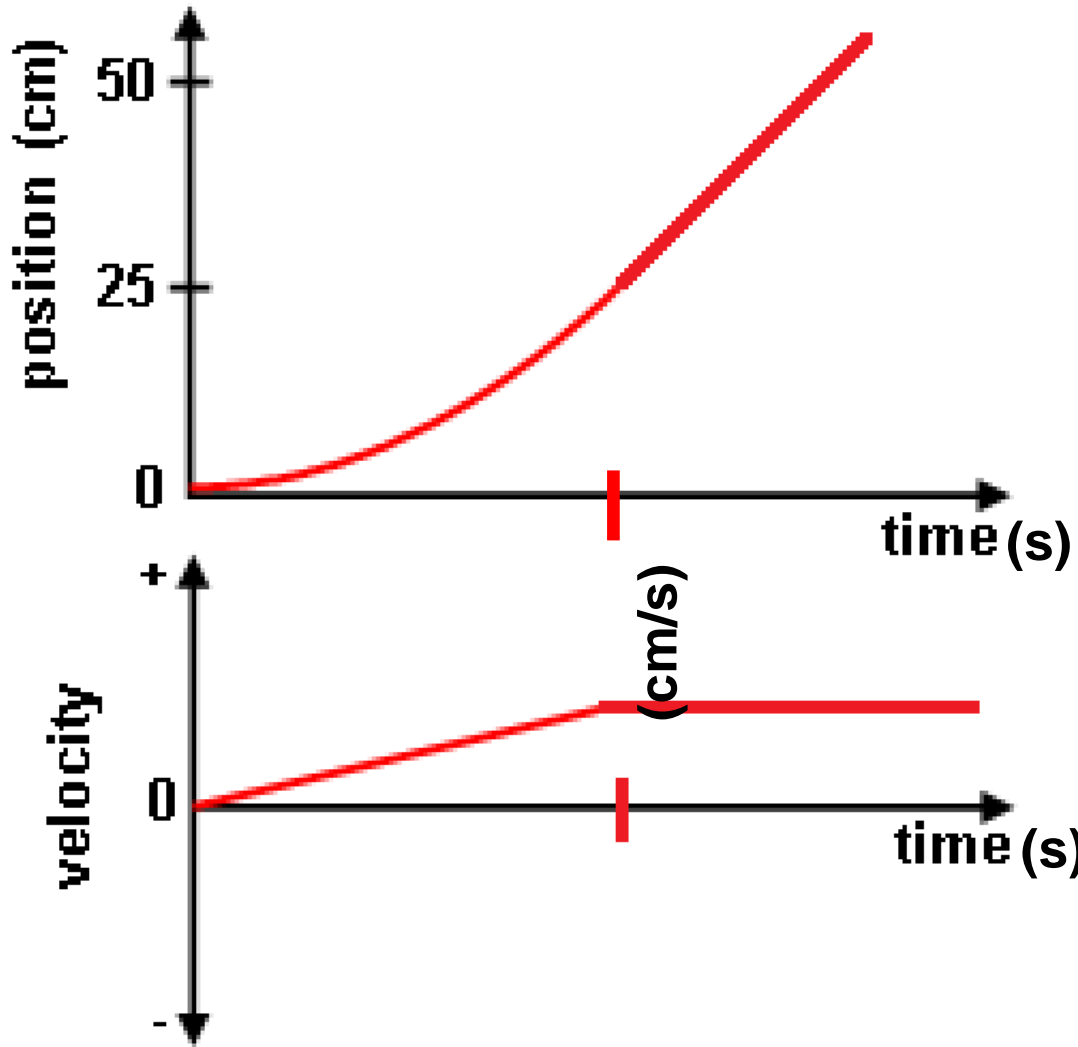


2. Draw a motion map along the ramp for the motion of the ball when released from rest.
3. Draw an $x-t$ & $v-t$, & acceleration –time ($a-t$) graphs that shows this motion.



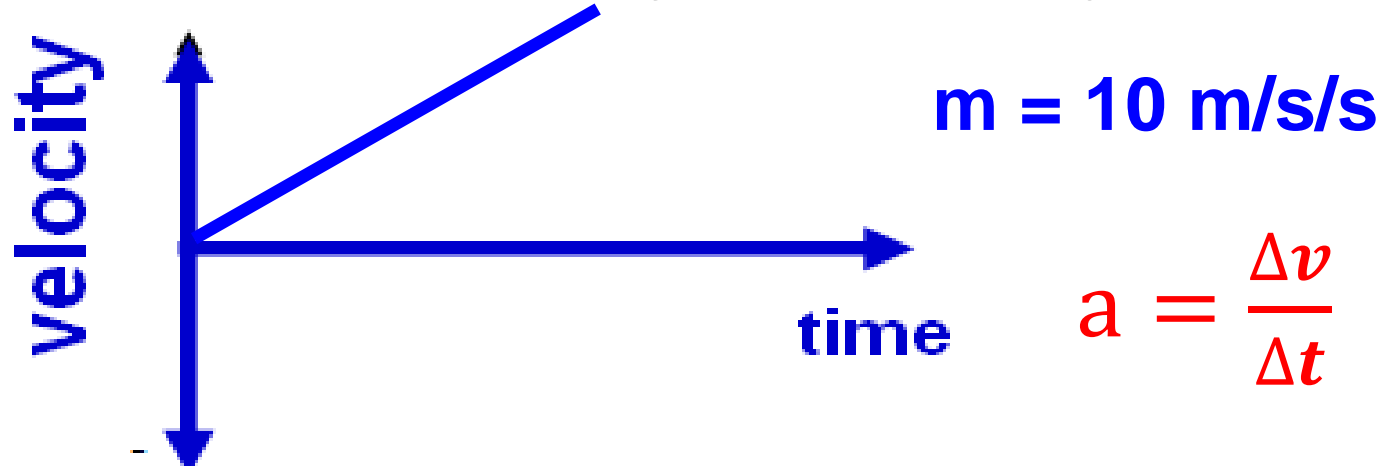
IB Physics Bell Work Wednesday, Feb 25., 2015

3. Draw the graphs



IB Physics Bell Work, Thursday, Mar 4 (5 ques.)

Sketch the graphs.



1. Write an equation for this v-t graph in the form of $y = mx + b$

$$y = m \cdot x + b$$
$$v_f = (10 \text{ m/s}^2) \cdot \text{time} + 0$$

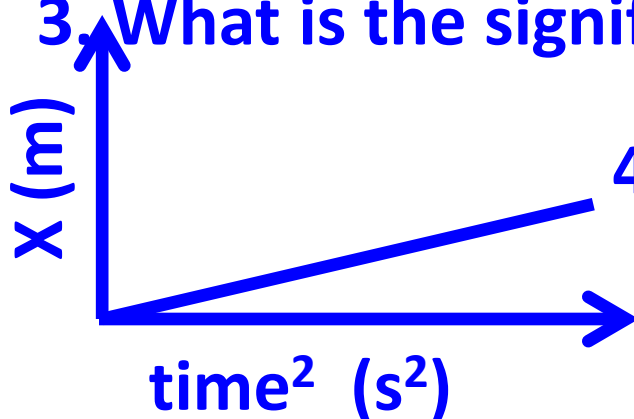
$$v_f = a \cdot t + v_0$$

2. What is the significance of the slope of this v-t graph?

Acceleration (how fast velocity is changing)

3. What is the significance of the slope of the x-t² graph?

½ the acceleration.

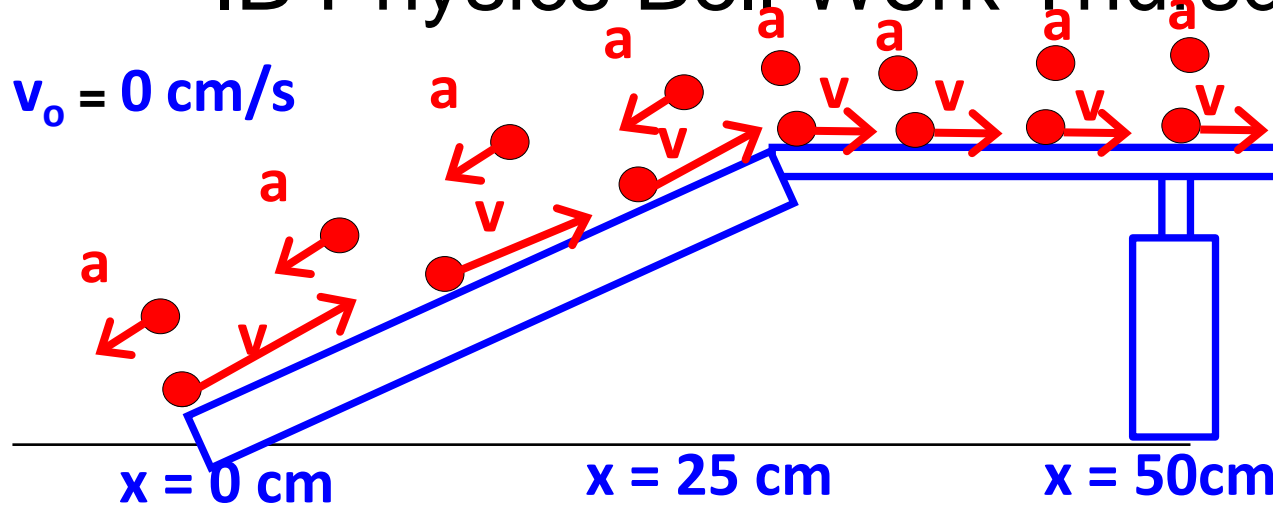


4. Write an equation for the graph.

$$\frac{\Delta x}{\Delta t^2} = \frac{\frac{\Delta x}{\Delta t}}{t} = a$$

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

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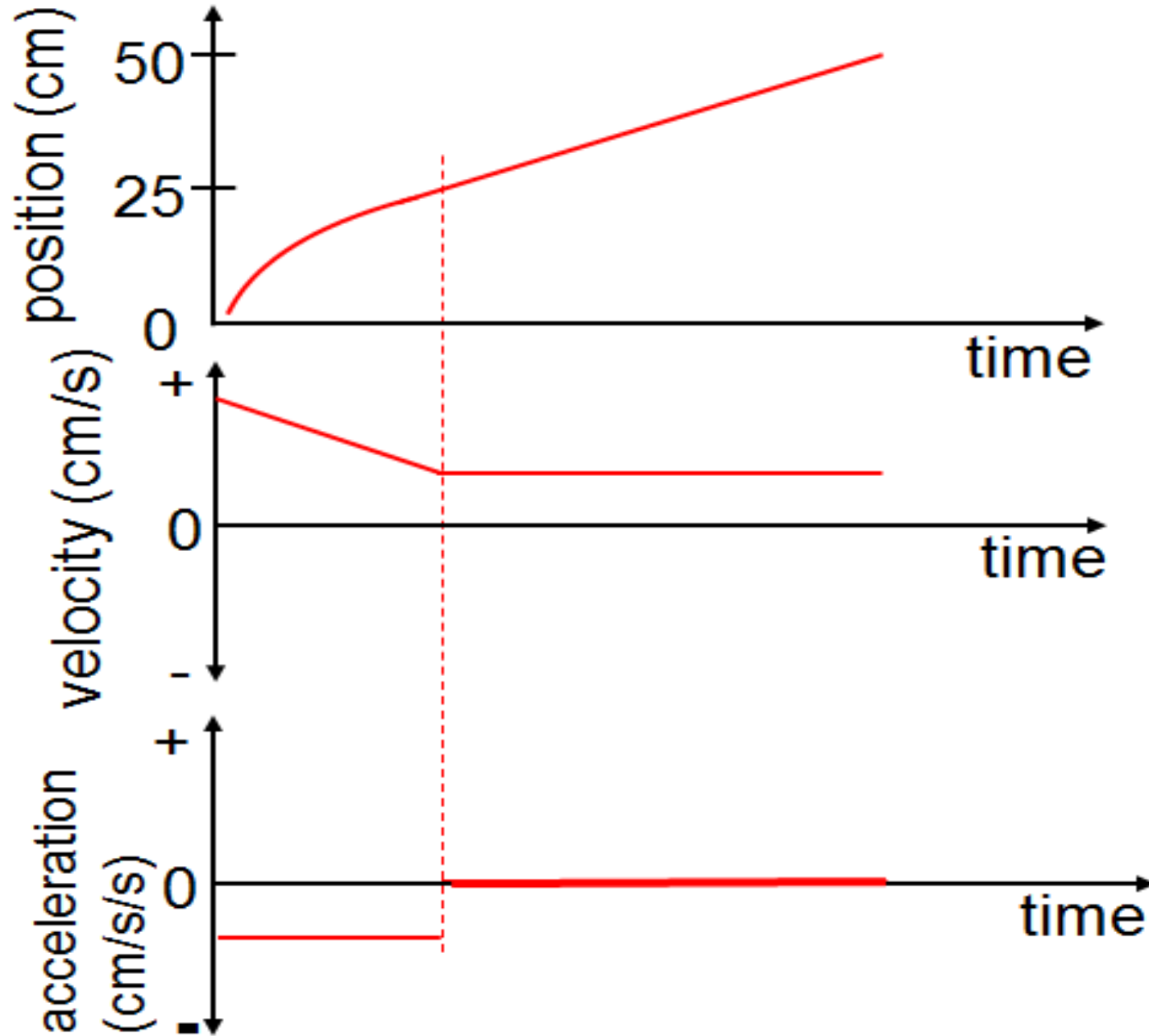


Draw the diagram

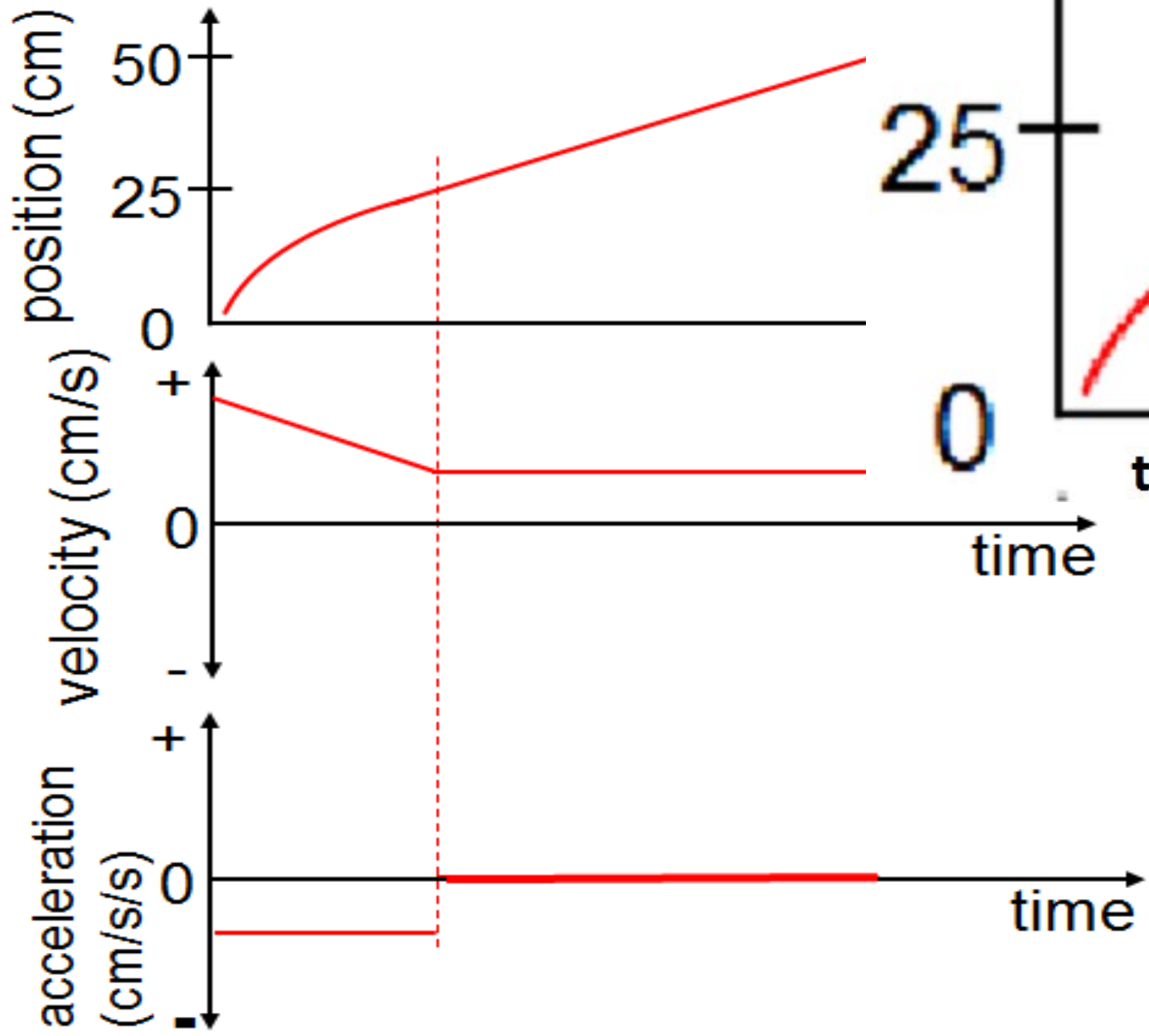


5. Draw a motion map along the ramp for the motion of the ball when released from rest.
6. Draw an $x-t$, $v-t$, & acceleration time ($a-t$) graphs that shows this motion

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25

0

time

time

time

