Notes: Kinematics Part 1

Kinematic Equation

$$x = v_{initial}\, t + \tfrac{1}{2}\, a\, t^2$$

x is distance traveled by the end of the time, measured in meters

$v_{initial}$

a

t

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a is the acceleration, the rate that the velocity changes

t is the time, measured in seconds

How to Solve a Kinematics Problem

1. Read the following problem
2. Highlight your “proof” for assigning variables
3. List the givens
4. Solve
5. Write your answer with the proper units

A skier, starting from rest, accelerates down a slope at 2.14 m/s^2. How far has she gone at the end of 4.50 s?

- Displacement - m, how far
- Initial velocity - m/s, starting from rest, initially/beginning, how fast...
- Acceleration - m/s^2
- Time - s, how long…

Givens	Work
x =	
v_i =	
a =	
t =	

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Suppose you are visiting a planet in a distant part of the galaxy. (Meaning that the “g” is different than it is on Earth). To determine the acceleration due to gravity on this planet, you drop a rock from a height of 20.0 m. The rock strikes the ground 3.40 s later. What is the acceleration due to gravity on this planet?

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Givens	Work
$x = -20.0$ m $v_i = 0$ m/s $a = ?$ $t = 3.40$ s	$x = v_{initial}\, t + \frac{1}{2}\, a\, t^2$ $-20.0 = (0) (3.40) + \frac{1}{2} (a) (3.40)^2$

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$v_i = 0$ m/s	$-20.0 = (0) (3.40) + \frac{1}{2} (a) (3.40)^2$
$a = ?$	$a = -3.46$ m/s^2
$t = 3.40$ s	