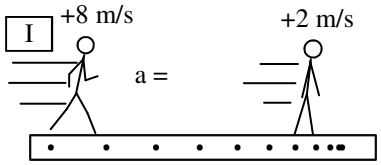
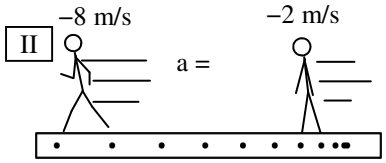
Due Thurs., Sept 6

2012 PreAP Linear Motion 7

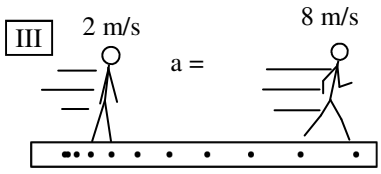
You should already know that right and up are + and left and down are −. Since velocity is change of position divided by time, you should know that anytime you are moving to the right, your position is becoming more +, so your velocity is +. Of course, then, if you are moving to the left, your position is becoming more −, so your velocity is −. Also, more + = less −. More − = less +.



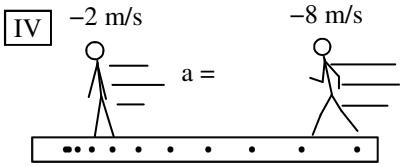
1. In his first situation, Slim Jim slows down in the + direction. Use 2 seconds for time.
   A. * Is his speed becoming more or less +?
   B. * Is his speed becoming more or less −?
   C. * Remembering that $\Delta v = v_f - v_i$, and $a = \Delta v/t$, calculate his acceleration and write it on the diagram.



2. In situation II, Slim Jim speeds up in the − direction. Still use t = 2 seconds.
   A. Is his speed becoming more or less −?
   B. Is his speed becoming more or less +?
   C. Calculate his acceleration and write it on the diagram.



3. In situation III, Slim Jim speeds up in the + direction. t = 2 seconds.
   A. Is his speed becoming more or less +?
   B. Is his speed becoming more or less −?
   C. Calculate his acceleration and write it on the diagram.



4. In situation IV, Slim Jim slows down in the − direction. You know the time.
   A. Is his speed becoming more or less −?
   B. Is his speed becoming more or less +?
   C. Calculate his acceleration and write it on the diagram.

5. So, now, are the following + or − acceleration?

   A. ____ An object is speeding up to the left.
   B. ____ An object is moving to the right and slowing down.
   C. ____ An object is moving right and speeding up.
   D. ____ An object is moving left and slowing down.

Here are your first kinematic equation problems. Use your notes and follow them exactly. You MUST show your work for these. Do NOT skip steps or you will probably mess up. Very sad.

6. * An object is accelerates for 6 seconds at 5 m/s^2. If it ends up going 24 m/s, use a kinematic equation to find its initial velocity. (*Let me walk you thru this step by step:)*

   A. * Next to each of the following variables write the number from the above question OR "unknown" (which is what you are asked to find) OR "not used" (meaning it is not given in the problem and you are not going to solve for it).
   Assign Variables:
   Δx =
   Vi =
   Vf =
   a =
   t =

   B. * Look at your "Kinematic Equation" notes and choose the equation that either has your variables you assigned in part A (including what you are solving for) OR choose the equation that does not have your "not used" variable:
   Equation:

   C. * Now it is just simple algebra (and why we did the math quiz). Put your numbers into the equation your chose and solve for the unknown.

7. A car is moving 12 m/s to the right and after 20 seconds it is moving 42 m/s to the right. How far did it travel in that time?
   A. Assign Variables:
   B. * Choose an equation:
   C. Put in #s and solve:

8. An object moving 16 m/s to the right stops in 18 meters. What is the acceleration of the object?
   A. Variables:
   B. Equation:
   C. Solve:

1A) less + 1B) More neg 1C) $(2 - (8))/2 = (-6)/2 = -3$ m/s^2

A. * Next to each of the following variables write the number from the above question OR "unknown" (which is what you are asked to find) OR "not used" (meaning it is not given in the problem and you are not going to solve for it).

Assign Variables:

$\Delta x =$ not used

$V_i =$ unknown

$V_f = 24$ m/s

$a = 5$ m/s^2

$t = 6$ sec

B. * Look at your "Kinematic Equation" notes and choose the equation that either has your variables you assigned in part A (including what you are solving for) OR choose the equation that does not have your "not used" variable:

Equation: $V_f = V_i + at$

C. * Now it is just simple algebra (and why we did the math quiz). Put your numbers into the equation your chose and solve for the unknown.

$V_f = V_i + at$

$24 = V_i + 5(6)$ → $24 = V_i + 30$, $-30 \quad -30$, $-6 \text{ m/s} = V_i$

7B) use $\Delta x = \frac{1}{2}(V_i + V_f)t$ because accel is not used in the problem.