**Simultaneous Equations of Motion** 12/19/13 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_ Date \_\_\_\_\_\_\_\_\_

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1. Object A starts at position 15 meters at time t=0, and moves at -1 m/s. Object B starts at position 3 meters, and moves at +1.5 m/s.

a) What are the equations of motion for the two objects?

$position\_{A}=-1\frac{m}{s}∙\left(t\right)+15m$ **(y = mx + b)**

$position\_{B}=$

b) Where will each object be at time 10 seconds?

 $position\_{A}=$ $position\_{B}=$

c) Choose a good scale for the graph to cover all the data. Graph the positions vs. time over the first 10 seconds. Label which line is A and which is B.

2. Object A starts at position 30 meters, and moves at 4 meters per second. Object B starts at 150 meters, and has a velocity of -5 meters per second. Choose a different graph scale for the y-axis (10m per box). Graph the motion from time 0 to 20 seconds.

What are the equations of motion for the two objects?

(If you need to, just use “y” and “x” as you did in algebra class, and later replace y and x with position and time.)

3. Object A moves according to the equation

  $position\_{A}=-6\frac{m}{s}∙\left(t\right)+100m$

 Object B moves with

 $position\_{B}=4\frac{m}{s}∙\left(t\right)+10m$

a) On a separate sheet of lined paper, calculate the positions of the objects over the first 20 seconds (every 5 seconds, starting at t=0) and make a table.

b) Graph the data on the graph to the right. Estimate the time and position at which the objects cross.

c) On a separate sheet, calculate algebraically what the crossing times and places should be, by setting the position equations equal to each other.