Rates – Part 2

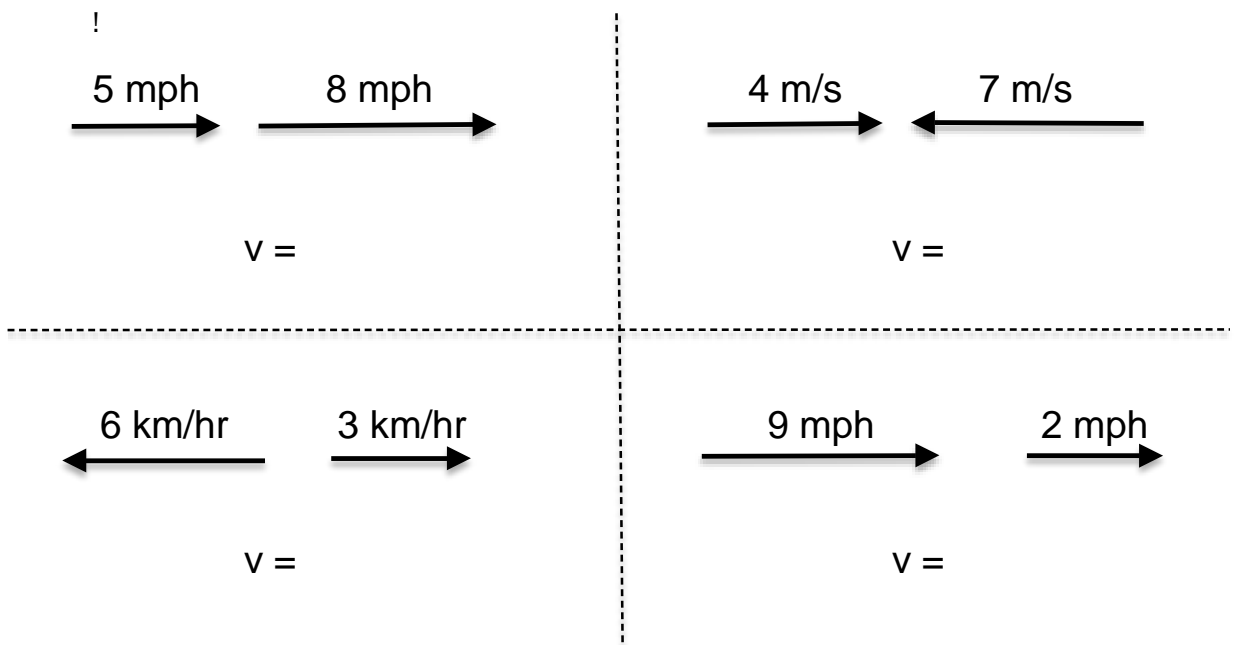## February 21, 2016

Warm Up

1. Write down a formula that shows how distance, S, is related to speed, v, and time, t.

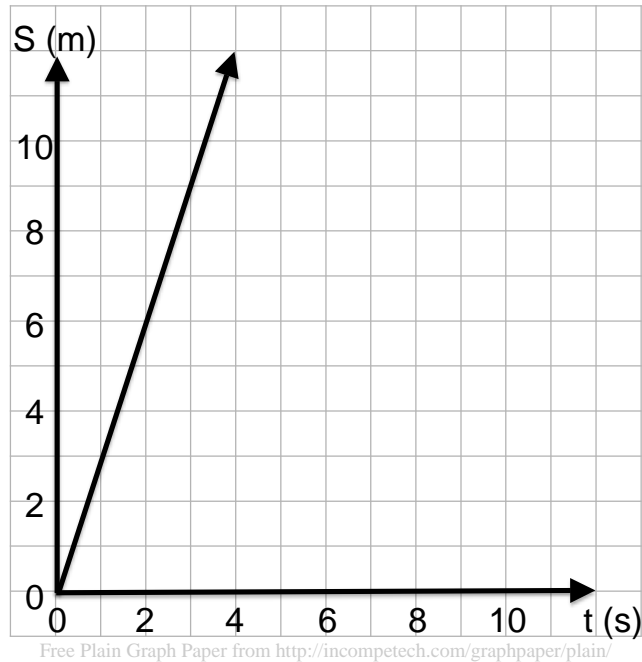$$S =$$

2. Find the relative speed of the following four situations (how much closer/farther the objects are per unit of time).

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5 mph → → → → 8 mph → → → →	4 m/s → → → → 7 m/s ← ← ← ←
V =	V =
← ← ← ← 6 km/hr 3 km/hr → → → →	9 mph → → → → 2 mph → → → →
V =	V =

Looking at Graphs

1. The following graph represents the distance Dimitri traveled over a certain time period.

(a)   What is Dimitri's speed?

(b)   Where will Dimitri be at $t = 2$?

(c)   How long will it take Dimitri to get to $S = 9$?

(d)   How long will it take him to get to $S = 15$?

2. On the same coordinate plane, graph S as a function of t if:

(a)   Dimitri's speed is 2 m/s.

(b)   Dimitri's speed is 1 m/s.

(c)   His speed is $\frac{1}{2}$ m/s.

3. Lydia and Emmie are running a mile. Lydia runs at a constant speed and is able to finish the mile in 8 minutes. For the first half of the distance, Emmie runs at half of Lydia's speed. For the second half of the distance, Emmie runs twice as fast as Lydia.
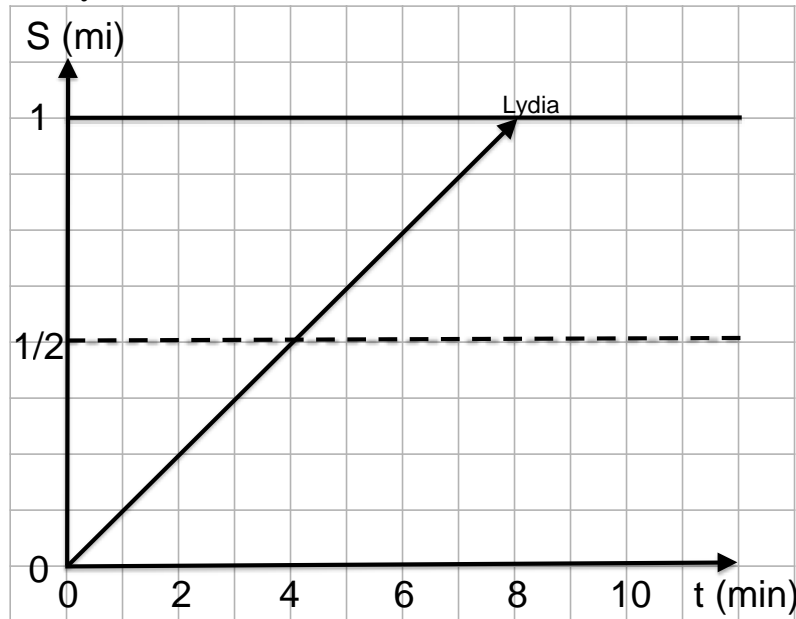
(a) Sketch the graph of the distance covered by Emmie before she reaches $\frac{1}{2}$ mi. Use your red colored pencil.

(b) Now sketch the graph of the distance covered by Emmie for the rest of the mile. Use your red colored pencil.

(c) How long does it take Emmie to run the mile? Who won the race?

4. For the next race, Emmie runs twice the speed of Lydia for the first half of the mile. Then, Emmie runs at half of Lydia's speed for the second half of the mile.

(a) Using the same coordinate plane from the previous problem, sketch the graph that shows how Emmie ran the mile. Use your blue colored pencil.

(b) How long does it take Emmie to run the mile? Who won the race?

(c) Do Emmie and Lydia ever meet? If so, at what time?

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5. Jocelyn and August live 50 meters away from each other. They are both at Jocelyn's house, and decide to walk to August's house. It takes August 50 seconds to walk to his house, and it takes 25 seconds for Jocelyn to walk to his house. Jocelyn leaves 10 seconds after August leaves. They both walk at constant speeds.

   (a) Using the coordinate plane below, graph the distance covered by August to get from Jocelyn's house to his house.

   (b) Now graph the distance covered by Jocelyn. Remember that Jocelyn leaves 10 seconds after August.

   (c) At what time does Jocelyn catch up to August?

   (d) How far is Jocelyn from her house when she catches up to August?
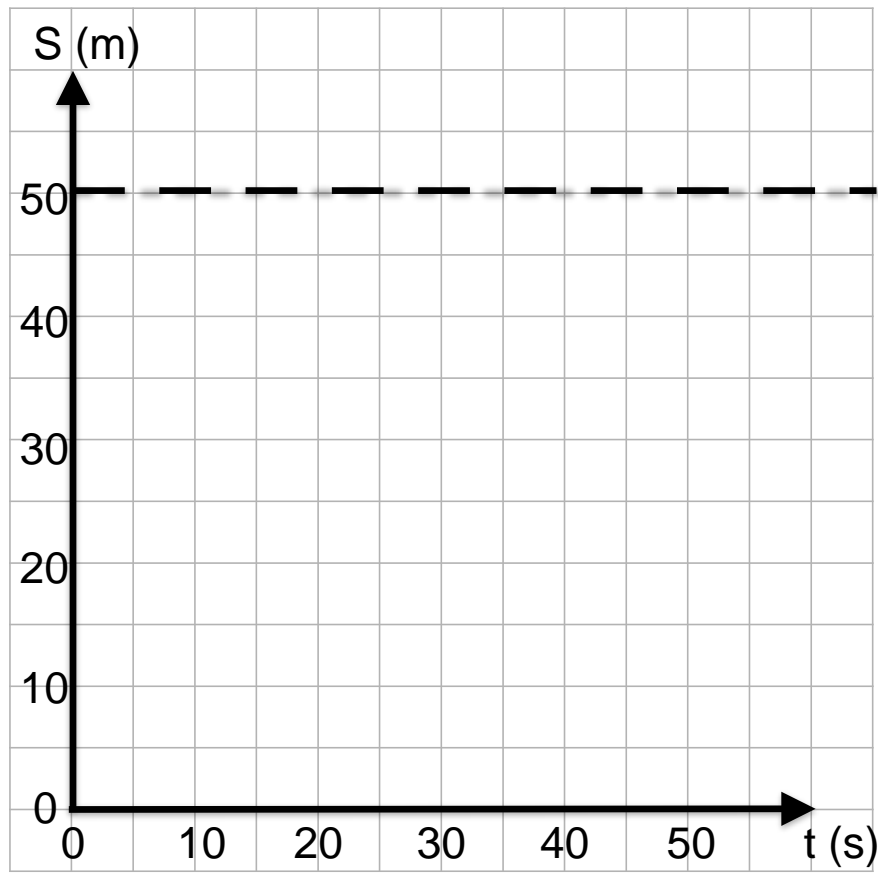
Two Moving Objects - Revisited

1. Julia and Mia are riding bikes towards each other. They start riding at the same time. Julia rides with the speed of 100 meters per minute. Mia rides with the speed of 80 meters per minute. They meet 3 minutes after they start riding. What was the distance between them in the beginning?

2. Jason and Mason run towards each. They start running at the same time. Jason runs with the speed of 50 meters per minute. Mason runs with the speed of 40 meters per minute. How long will it take them to meet if the distance between them in the beginning is 450 meters?

3. Alexander walks from his house to school with the speed of 20 meters per minute. When he is 180 meters away from his home, his sister starts running in the same direction with the speed of 80 meters per minute. How long does it take her to catch up with Alexander?

Completing Tasks

1. Kate is able to sign 5 Christmas cards per minute. Jereth is able to sign 3 Christmas cards per minute. How many total Christmas cards are they able sign in 5 minutes?

2. Ariella and Leo need to wash the dishes after eating dinner. There are a total of 15 dishes to wash. Leo is able to wash 2 dishes per minute. If it takes Leo and Ariella 3 minutes to wash the dishes when working together, how many dishes is Ariella able to wash per minute?

3. Elijah is able to mow 1 lawn in an hour. Leo is able to mow 3 lawns in an hour. How much time will it take them to mow one lawn if they both work together?

4. Emma and Saida are folding laundry. All together, they have to fold 6 piles of clothes. It takes Emma 10 minutes to fold one pile. How long does it take Saida to fold one pile if it takes them 20 minutes to fold all the laundry?