Math 60/80 "Applications Solving Systems – Rate x Time = Distance and Mixture Problems"

1) Suppose a Piper aircraft flying 500 miles west into the wind takes 5 hours. The return trip with the wind takes 4 hours. Find the groundspeed of the plane and speed of the wind. (NOTE: Groundspeed of a plane is the speed without any wind effect)

2) A boat is rowed down a river a distance of 16 miles in 2 hours; it is rowed upstream into the current, the same distance, in 8 hours. Find the speed of the current and the speed of the boat in still water.

3) With a tailwind, a small aircraft can fly 600 miles in 3 hours. Against the same wind, the plane can fly the same distance in 4 hours. Find the speed of the wind and speed of the plane.

4) A cyclist can go 36 miles with the wind blowing at her back in 3 hours. On the return trip, after 4 hours, the cyclist will still have 4 miles remaining to return to the starting point. Find the speed of the cyclist and speed of the wind.

5) A southwest Airlines plane can fly 455 mph against the wind and 515 mph with the wind. Find the speed of the wind and the groundspeed of the plane.

6) A store manager mixes together nuts and M&M's to make a trail mix. The manager created 10 pounds of the mix and sold it for $5.10 per pound. If the price of the nuts was $3 per pound and the price of the M&M's was $6 per pound, how many pounds of each was used to create the mix?

7) A coffee shop blends two types of coffee to create a breakfast blend. They mix a mild coffee that sells for $7.50 per pound and a robust coffee that sells for $10.00 per pound. The owner wants to make 12 lbs. of breakfast blend that will sell for $8.75 per pound. How much of each coffee should he use?

8) A coffee company wants to market a new blend of coffee that will sell for $3.90 per lb by mixing two coffees that sell for $2.75 per lb and $5 per lb. respectively. What amounts of each coffee should be mixed to make 100 pounds of the desired mix?

9) A lab assistant is asked to mix a 30% alcohol solution with 21 liters of an 80% alcohol solution to make a 60% alcohol solution. How many liters of the 30% solution should be used?

10) How many liters of 10% silver must be added to 70 liters of 50% silver to make an alloy that is 30% silver?

Answers:
1) Wind's speed is 12.5 mph, plane 112.5 mph. **4)** Cyclist travels 10 mph, wind 2 mph
5) Airplane 485 mph, wind 30 mph. **6)** The manager mixed 3 lbs. of nuts and 7 lbs of M&M's
8) 48.9 lbs of the $2.75 coffee and 51.1 lbs of the $5 per pound coffee **9)** 14 liters