Name:_____ Date:_____

Math 12 Honors: HW Section 1.6 Applications of Rational Functions

1. Jason can fill a water tank in 40 min using a large hose. He takes 60 min using a smaller hose. How long will he take if he uses both hoses?

2. Mario can take inventory at the store in ½ hour. His partner, Carmen, can take inventory in 20min. If they work together, how long will the inventory take?

3. Andrew can deliver 500 handbills in 2h. Amos can deliver the same number in 3h. How long will they take to deliver 500 handbills if they work together?

4. Suppose Andrew can deliver 300 wedding cards in 2h. Susan can deliver the 400 cards number in 3h. How long will they take to deliver 1000 cards if they work together?

5. On a highway between Vancouver to Kelowna, the speed limit is 90km/hr and the distance is 390km. Most cars take about 4 hours and 20minutes. Some marks travel faster than 90km/hr and some slower, taking either more or less time respectively.
    a. If someone travels at 120km/hr, how much time will they save?

    b. At what speed does it take to make the trip in 4hours?

6. The average cost "A" dollars, of printing the school agenda is given by the equation: $A = \frac{2500 + 1.25n}{n}$, where "n" is the number printed.
    a. Determine the average cost when 500 agendas are printed

    b. Determine the number of agendas are printed when the average cost is $8.00?

7. A tour boat's top speed is 40km/h on calm water. The boat leaves its dock and goes straight upstream 15km to see a waterfall. It then returns downstream to it's dock. On both trips the boat travels on full speed. Suppose the current is 25km/h, what is the time needed for a round trip of the tour?

8. Amy flies her plane each week from Lethbridge to Moose Jaw and back at an air speed of 180km/h. On the flight out there is a constant tail wind of 20km/hr and on the return trip with a head wind of the same speed. Calculate the time needed for a round trip.

b) Suppose Amy is the pilot and she needs to make the round trip in 5hours, what speed would she need to fly? Suppose the stopover time is very short. Windspeed is 20km/h.

c) Suppose Amy is flying her plane at a speed that is very close to the windspeed. How long will it take to make her round trip?

9. On the way from Vancouver to Seattle, the speed limit is 110km/h. Since the distance between the cities is approximately 230km, a trip between the two cities is about 2.1hours (Excluding border wait time). Cars travelling faster can reach their destination within 2.1 hours.
    a. Let "s" represent the change in speed compared with 110km/h. Let "t" represent the change in time compared with 2.1hrs. Write "t" as a function of "s"

    b. How much time will you save driving at 125km/h?

    c. At what speed does it take to save 10min?

10. The average speed of a car is 50km/h faster than the average speed of a cyclist. To travel 225km, the cyclist requires 5h more than the car. Determine the average speed of both the cyclist and the car.

11. An plane flies 900km with a tailwind and then returns the same distance against the wind. The round trip lasts 7 hours. If the plane's speed in still air is 280km/hr, what is the speed of the wind?

12. An airplane travels between two cities that are 350 km apart. One day the airplane leaves 15 minutes behind schedule. In order to arrive at its destination on time, the airplane flies 25km/h faster than usual. What is the airplane's speed? Avg windspeed is 30km/h.

13. Emily can row 10km/hr in still water. One day it took her 4 hours longer to go a certain distance upstream than the same distance downstream. If the speed of the current was 5km/hr, how far upstream did she go?

14. A group of hikers need to travel 80km from Camp A to Camp B and then 128km from Camp B to Camp C. It takes two days more to travel from B to C than from A to B. The average speed from A to B is also 3km/day more than the average speed from B to C. What was the average speed of travel from Camp A to B?

15. Tim and Hank paint a fence for four hours, after which Jack helps them and they finish two hours later. If jack had not helped them, it would have taken them five more hours to paint the fence. How long would it take for Jack to paint the fence alone?

16. Emily sees a ship travelling at a constant speed along a straight section of a river. She walks parallel to the riverbank at a uniform rate faster than the ship. She counts 210 equal steps walking from the back of the ship to the front. Walking in the opposite direction, she counts 42 steps of the same size from the front of the ship to the back. In terms of Emily's equal steps, what is the length of the ship? (AMC10)

17. Jillian drives along a straight road that goes directly from her house (J) to her Grandfather's house (G). Some of this road is on flat ground and some is downhill or uphill. Her car travels downhill at 99km/h , on flat ground at 77km/h , and uphill at 63km/h. It takes Jillian 3 hours and 40 minutes to drive from (J) to (G). It takes her 4 hours and 20 min to drive from (G) back to (J). What is the distance between (J) and (G)?(Fermat)

1. Let "a", "b", and "c" be three different real integers. Prove that

$$\frac{a-b}{1+ab}+\frac{b-c}{1+bc}+\frac{c-a}{1+ca}\neq 0$$

Find the positive solution to the equation below: [Brilliant level 3]

$$\frac{1}{x^2-10x-29}+\frac{1}{x^2-10x-45}-\frac{2}{x^2-10x-69}=0$$

