Section 7.4 Homework and Math 6A problems

Suggestion: Do the Math 6A problems first.

Math 6A, Problem 7 on page 81

If Daniel took 2 hours to drive from Town A to Town B at 60 km/hr, then he drove a total distance of 60 km/hr × 2 hr = 120 km. The formula, Distance = Rate × Time may be rewritten as Time = Distance / Rate. Using this, and letting T be the time in hours for the trip at 80 km/hr, we get

T = 120 km / (80 km/hr) = 120/80 hr = 3/2 hr = 1 hour and 30 minutes.

Math 6A, Problem 2 on page 82

a) Distance = 10 km/hr × 2 hr = 20 km.

b) His increased average speed is 12 km/hr. So the time for the trip at this speed is 20 km/(12 km/hr) = 20/12 hr = 5/3 hr = 1 hour and 40 minutes.

Section 7.4 Problems

4. $1.9 \ \frac{\text{liter}}{\text{sec}} = 1.9 \ \frac{\text{liter}}{\text{sec}} \times \frac{1}{3.8} \ \frac{\text{gal}}{\text{liter}} \times \frac{60}{1} \ \frac{\text{sec}}{\text{min}}$

$$= (1.9 \times \frac{1}{3.8} \times \frac{60}{1}) \ \frac{\text{liter}}{\text{sec}} \times \frac{\text{gal}}{\text{liter}} \times \frac{\text{sec}}{\text{min}} = 30 \ \frac{\text{gal}}{\text{min}}$$

The answer is $30 \ \frac{\text{gal}}{\text{min}}$. Note how the units cancel as if they were numbers and note also that $\frac{1}{3.8} \ \frac{\text{gal}}{\text{liter}}$ is another name for 1 because 1 gallon is the same as 3.8 liters, and $\frac{60}{1} \ \frac{\text{sec}}{\text{min}}$ is another name for 1 because 60 seconds is the same as 1 minute.

5. 0.3 liters/ meter^2 / day × 7 days/week × 6000 meter^2
= (0.3 × 7 × 6000) liters/week = 12,600 liters/week

6. The answer is c) 48 mph.

Here is the solution: Average speed is the total distance traveld divided by the time it took. Let D be the distance between City A and City B. And let T be the time it took to travel from City A to City B at a speed of 60 mph. Then D/T = 60 mph.

Since T is the time it took to go from City A to City B at 60 mph, 3T/2 is the time for the return trip at the speed of 40 mph.

The total distance for the round trip is 2D. The total time for the round trip is T + 3T/2 = 5T/2. The average speed (distance over time) is 2D/(5T/2) = 4/5 × D/T = 4/5 × 60 mph = 48 mph.

7. Let "job" mean filling the swimming pool.
The first hose fills the pool at a rate of $\frac{1}{30}\ \frac{\text{job}}{\text{hour}}$.

The second hose fills the pool at a rate of $\frac{1}{70}\ \frac{\text{job}}{\text{hour}}$.

Together they fill the pool at a rate of $(\frac{1}{30} + \frac{1}{70})\ \frac{\text{job}}{\text{hour}} = \frac{1}{21}\ \frac{\text{job}}{\text{hour}}$. So the job is completed after 21 hours. The answer is 21 hours.

8. The first corn mill grinds corn at a rate of $\frac{50}{6}\ \frac{\text{pounds}}{\text{min}}$.

The second corn mill grinds corn at a rate of $\frac{50}{9}\ \frac{\text{pounds}}{\text{min}}$.

Together they grind corn at a rate of $(\frac{50}{6} + \frac{50}{9})\ \frac{\text{pounds}}{\text{min}} = \frac{125}{9}\ \frac{\text{pounds}}{\text{min}}$.

If T is the number of minutes required to grind 1500 pounds of corn, then

$\frac{125}{9}\ \frac{\text{pounds}}{\text{min}} \times$ T min = 1500 pounds. So, T min = 1500 pounds $\div \frac{125}{9}\ \frac{\text{pounds}}{\text{min}} =$

1500 pounds $\times \frac{9}{125}\ \frac{\text{min}}{\text{pounds}}$ = 108 min. The answer is 108 minutes.