

Homework 1.10 – Modeling with Functions

Problem 1:

- A car rental agency charges \$200 per week plus \$0.15 per mile to rent a car.
 - Express the weekly cost to rent the car, f , as a function of the number of miles driven during the week, x .
 - How many miles did you drive during the week if the weekly cost to rent the car was \$320?

Problem 2:

- In 1954, Roger Bannister of Britain cracked the 4-minute mark, setting the record for running a mile in 3 minutes, 59.4 seconds, or 239.4 seconds. In the half-century since then, the record has decreased by 0.3 second per year.
 - Express the record time for the mile run, M , as a function of the number of years after 1954, x .
 - If this trend continues, in which year will someone run a 3-minute, or 180 second, mile?

Problem 3:

- The bus fare in a city is \$1.25. People who use the bus have the option of purchasing a monthly discount pass for \$21.00. With the discount pass, the fare is reduced to \$0.50.
 - Express the total monthly cost to use the bus without a discount pass, f , as a function of the number of times in a month the bus is used, x .
 - Express the total monthly cost to use the bus with a discount pass, g , as a function of the number of times in a month the bus is used, x .
 - Determine the number of times in a month the bus must be used so that the total monthly cost without the discount pass is the same as the total monthly cost with the discount pass. What will be the monthly cost for each option?

Problem 4:

- You are choosing between two plans at a discount warehouse. Plan A offers an annual membership of \$100 and you pay 80% of the manufacturer's recommended list price. Plan B offers an annual membership fee of \$40 and you pay 90% of the manufacturer's recommended list price.
 - Express the total yearly amount paid to the warehouse under plan A, f , as a function of the dollars of merchandise purchased during the year, x .
 - Express the total yearly amount paid to the warehouse under plan B, g , as a function of the dollars of merchandise purchased during the year, x .
 - How many dollars of merchandise would you have to purchase in a year to pay the same amount under both plans? What will be the total yearly amount paid to the warehouse for each plan?