Review Exercise Set 7

Exercise 1: Triple F car rentals charges $175 per week plus $0.18 per mile to rent a car. Express the total weekly cost to rent a car as a function of the number of miles driven. How many miles has a customer driven if their weekly cost was $265?

Exercise 2: The sum of two numbers is 24. Express the product of the numbers as a function of one of the numbers.

Exercise 3: An open box will be made from a 13 inch by 15 inch piece of cardboard with x inch by x inch squares cut out of each corner once the sides are folded up. Express the volume of open box as a function of x.
Exercise 4: A farmer has 1200 feet of fencing that he can use to enclose a rectangular area and split it in two by another fence that runs parallel to one side of the area. Express the area of the rectangular area as a function of the length of the fence that splits the area.

Exercise 5: Maria recently inherited $20,000 from her aunt Katy. Maria invested the money into two different accounts. One of the accounts pays 7% annual interest while the second pays 15% annual interest. Express the expected interest from both investments as a function of the money invested at 7%.
Review Exercise Set 7 Answer Key

Exercise 1: Triple F car rentals charges $175 per week plus $0.18 per mile to rent a car. Express the total weekly cost to rent a car as a function of the number of miles driven. How many miles has a customer driven if their weekly cost was $265?

Assign variable to unknown values

\[ x = \text{number of miles driven} \]

Identify given information

Weekly charge = $175
Per mile charge = $0.18
Total weekly cost = $265

Setup the function for finding the total weekly cost, \( W(x) \)

\[ W(x) = \text{Weekly charge} + \text{Per mile charge} \times \text{Number of miles driven} \]
\[ W(x) = 175 + 0.18x \]

Solve for \( x \) when \( W(x) = 265 \)

\[ 265 = 175 + 0.18x \]
\[ 90 = 0.18x \]
\[ 500 = x \]

The customer must have driven 500 miles during the week.

Exercise 2: The sum of two numbers is 24. Express the product of the numbers as a function of one of the numbers.

Assign variable to unknown values

\[ x = \text{first number} \]
\[ y = \text{second number} \]

Identify given information

Sum of both numbers = 24
\[ x + y = 24 \]

Solve the equation for the sum of both numbers for one of the variables

\[ y = 24 - x \]

Setup the function for the product of the numbers

\[ \text{product} = xy \]
\[ p(x) = x(24 - x) \]
\[ p(x) = 24x - x^2 \]
Exercise 3: An open box will be made from a 13 inch by 15 inch piece of cardboard with x inch by x inch squares cut out of each corner once the sides are folded up. Express the volume of open box as a function of x.

Draw image of the problem

Identify the sides of the box

length = 15 - 2x  
width = 13 - 2x  
height = x

Use the volume formula to setup the function

\[ V(x) = (15 - 2x)(13 - 2x)(x) \]
\[ V(x) = (195 - 56x + 4x^2)(x) \]
\[ V(x) = 195x - 56x^2 + 4x^3 \]
Exercise 4: A farmer has 1200 feet of fencing that he can use to enclose a rectangular area and split it in two by another fence that runs parallel to one side of the area. Express the area of the rectangular area as a function of the length of the fence that splits the area.

Draw image of the problem

Identify the dimensions of the area

length = x
width = y

Use the perimeter formula to express the dimensions in a single variable

Perimeter = sum of all sides
1200 = 3x + 2y
1200 - 3x = 2y
\[
\frac{1200 - 3x}{2} = y
\]
600 - \frac{3}{2}x = y

Use the area formula to setup the function

Area = Length * Width
Area = xy

\[
A(x) = x(600 - \frac{3}{2}x)
\]

\[
A(x) = 600x - \frac{3}{2}x^2
\]
Exercise 5: Maria recently inherited $20,000 from her aunt Katy. Maria invested the money into two different accounts. One of the accounts pays 7% annual interest while the second pays 15% annual interest. Express the expected interest from both investments as a function of the money invested at 7%.

Assign variable to unknown values

\[ x = \text{amount invested in first account} \]
\[ y = \text{amount invested in second account} \]

Identify given information

Total invested = 20000
Interest rate on first account = 7% (or 0.07)
Interest rate on second account = 15% (or 0.15)

Use the total amount invested to express the accounts in a single variable

\[ x + y = 20000 \]
\[ y = 20000 - x \]

Use the Simple Interest formula to setup the function

Annual Interest = Principal * Interest Rate
\[ I_1 = x \times 0.07 \]
\[ I_1 = 0.07x \]
\[ I_2 = (20000 - x) \times 0.15 \]
\[ I_2 = 3000 - 0.15x \]
\[ I(x) = I_1 + I_2 \]
\[ I(x) = 0.07x + 3000 - 0.15x \]
\[ I(x) = 3000 - 0.08x \]