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 = 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) = Weekly charge + Per mile charge * 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 = first number
y = 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

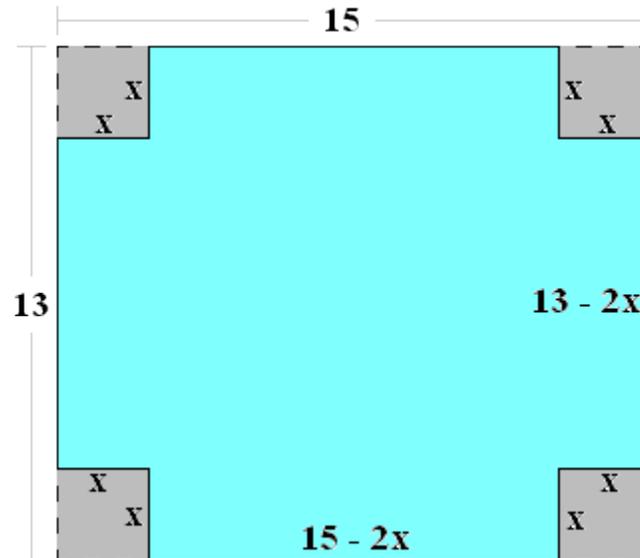$y = 24 - x$

Setup the function for the product of the numbers

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

     Volume = Length * Width * Height
     $V(x) = (15 - 2x)(13 - 2x)(x)$
     $V(x) = (195 - 56x + 4x^2)(x)$
     $V(x) = 195x - 56x^2 + 4x^3$

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
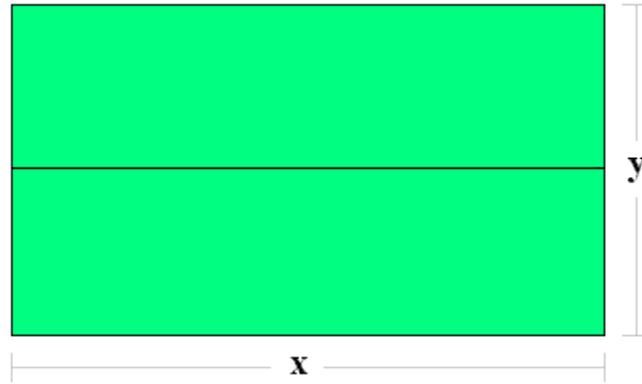
Identify the dimensions of the area

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
$\dfrac{1200 - 3x}{2}$ = y

600 - $\dfrac{3}{2}$ x = y

Use the area formula to setup the function

Area = Length * Width
Area = xy
A(x) = x(600 - $\dfrac{3}{2}$x)
A(x) = 600x - $\dfrac{3}{2}$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 = amount invested in first account
y = 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

Amount in 1st account + Amount in 2nd account = Total invested
x + y = 20000
y = 20000 - x

Use the Simple Interest formula to setup the function

Annual Interest = Principal * Interest Rate
I_1 = x * 0.07
I_1 = 0.07x

I_2 = (20000 - x) * 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