Mohammed Kaabar | MAT-52 Fall 2016 Elementary Algebra | M – Tu Aug. 29 – Aug. 30 2016

* Review to Basic Algebra:

Vary $\Leftrightarrow$ Change

• Definition: Variable: is defined as something that is always changeble, and it is represented by usually alphabetic character (letter). This letter represents a number which is the value of the variable.

① For example: In arithmetic, we got introduced to expressions such as $\boxed{15+2}$, $\boxed{5\times 2}$, $\boxed{\frac{4}{7}}$, and $\boxed{10-3}$. Now, using the above mathematical expressions, what are the values for the following variables:

(a) Find m if $m+2$.

Answer: Since $15+2$, then $m+2=15+2$

$m=15+2-2$

So, $\boxed{m=15}$

⑥ Find x if $\frac{4}{x}$.

Answer: Since $\frac{4}{7}$, then $\frac{4}{x} = \frac{4}{7}$

Here, we do a method known as **cross multiplication** as follows:

$$\frac{4}{x} \times \frac{4}{7}$$

$$(4 \times 7) = (4 \times x)$$

$$28 = 4x$$

Then, to isolate x, we need to divide **both sides** by the number next to x which is in our case is 4 as follows:

$$\frac{28}{4} = \frac{4x}{4}$$

$$7 = x \quad \text{So, } \boxed{x = 7}$$

which is the value of the variable x.

© Find α if $\alpha X 2$.

α is a Greek letter called "Alpha"

Answer: Since $5X2$, then $\alpha X 2 = 5X2$

this implies: $2\alpha = 10$

to isolate α, we divide both sides by 2 as follows:

$$\frac{2\alpha}{2} = \frac{10}{2}$$ (5)

$$\Rightarrow \boxed{\alpha = 5}$$ which is the value of the variable α.

(d) Find Ω if $10 - \Omega$.

Ω is a Greek letter called "omega"

Answer: Since $10-3$, then $10 - \Omega = 10 - 3$

So, $10 - \Omega = 10 - 3$

$-\Omega = -10 + 10 - 3$

$+\Omega = +3$

$$\boxed{\Omega = 3}$$

which is the value of the variable Ω.

*Important Note: If the letter stands only for "fixed" one number, then we call it constant.

② For example: Mohammed bought a 2006 Cadillac Escalade. Assuming y is the age of Mohammed's car and z is the year when Mohammed's car was built. Find y and z. Then, determine which one is variable, and which one is constant.

Solution: Mohammed's car was built in 2006 and now we are in 2016.

So, the model's year of Mohammed's car is fixed (Does NOT Change) $\Rightarrow$ which is 2006 $\Rightarrow$ Therefore, it is constant.

Hence, z is 2006 "Constant".

Now, we asked this question in 2016, therefore, the age of Mohammed's car kept changing from 2006 to 2016. Therefore, y is $2016-2006=$ 10 years which is the age of Mohammed's car

Hence, $y = 10$ years "variable" because the age of Mohammed's car keeps changing every year.

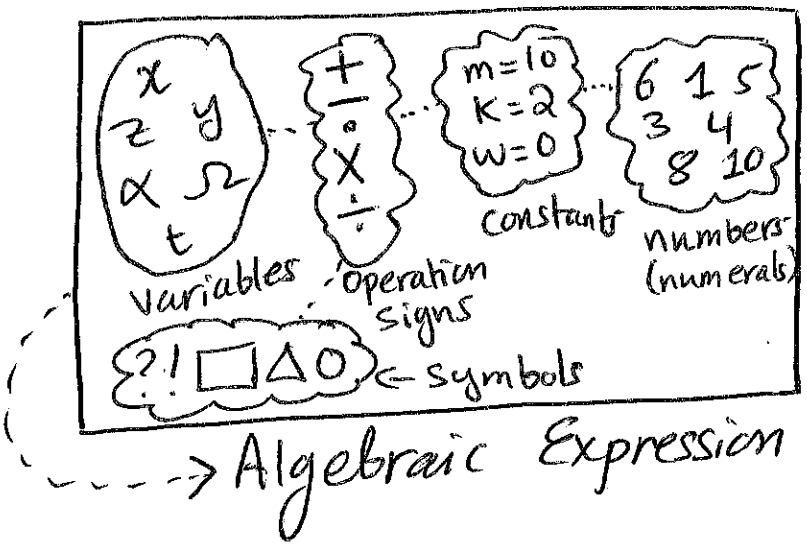
* Algebraic Expression

- let's first analyze: "Algebraic Expression"

Algebra

Express

How to express algebra?!



Note

When you replace a given variable by a value to evaluate the algebraic expression, this method is known as "Substitution"

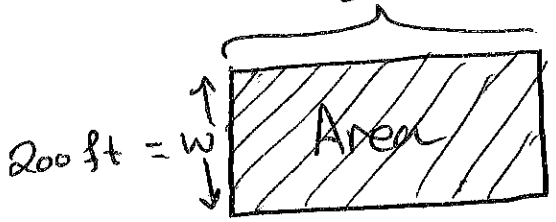
Example ③: Evaluate $w - \beta$ when $w = 10$ and $\beta = 5$.

Solution: $w - \beta = 10 - 5 = \boxed{5}$

Example ④: A rectangular land of length l and width w. If given: A is the area of rectangular land, length is 300 ft, and width is 200 ft. Find the area of the rectangular land.

Solution:

Step 1: Draw the rectangular area as follows:



Step 2: What is the area of rectangle?

Answer: Area of rectangle = length X Width

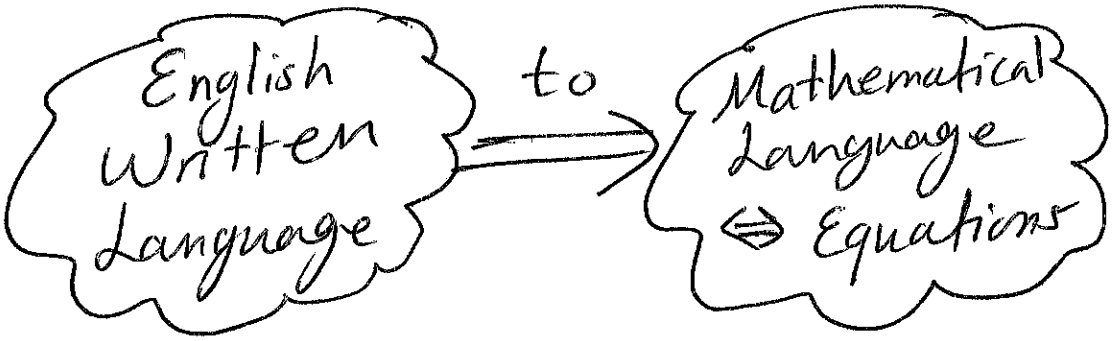
Step 3: Now, insert the symbol given in the question to step 2, we obtain

$$A = l \times W$$

Step 4: Using the substitution method for step 3, we obtain: $A = (300) \times (200) = \boxed{60{,}000\ ft^2}$

square feet
$ft \times ft = ft^2$

* How to translate the Algebraic Expression?!



- Common Words, Phrases, and Concepts

(+) Addition
add
sum
total
more than
greater than
added to
increased by

(−) Subtraction
difference
subtracted from
subtract
minus
less than
smaller than
decreased by
take away

(·) or (×) Multiplication
multiplied by
times
of
product
multiply

(÷) or (/) Division
divided by
quotient
divide

Example ⑤: Translate from English Language to Math language:

→ Math Language is the algebraic expression language.

ⓐ 100 less than some number

It's always optional choice

Solution: Assume the number is w, then

$$w - 100$$

ⓑ Twenty-nine percent of some number

Solution: Assume the number is β, then

$$29\% \beta \quad \text{or} \quad 0.29\beta \quad \text{or} \quad \frac{29}{100}\beta$$

ⓒ Nine more than four-times some number.

Solution: Assume the number is t, then

$$9 + 4 \times t \quad \text{or} \quad 9 + 4 \cdot t \quad \text{or} \quad 9 + 4t$$

↑ the best form