WORD PROBLEMS
Translating English into Math

Math Symbols

+	–	×	÷	=
plus sum of added to more than increased by greater than	minus difference of *subtracted from* *less than* decreased by	times product of multiplied by twice doubled, tripled, etc…	divided by quotient of over per into ratio of	equals is equal to is total…is the same as the result is

Others Math Symbols

"is less than" $\qquad\qquad\qquad <$

"is less than or equal to" $\qquad\quad \leq$

"is greater than" $\qquad\qquad\quad >$

"is greater than or equal to" $\qquad \geq$

"squared" $\qquad\qquad\qquad$ Raise to the power of 2 $\quad$ ***example:*** n^2

"cubed" $\qquad\qquad\qquad\quad$ Raise to the power of 3 $\quad$ ***example:*** n^3

"a number", "a value", etc $\quad$ These unknowns turn into variables, such as x or n

IMPORTANT!!!
Always <u>reverse the order</u> for any statements that have

"less than" or *"subtracted from"*.

"*A number **less than** five*" would translate to "$5-n$" or

"*10 **subtracted from** a number*" would translate to "$n-10$"

The word "*total*" means add all the values and set equal to.

"*The **total** of ten, twenty and a number **is** sixty*" would translate to "$10+20+n=60$".

The phrase "*greater than*" differs from the phrase "*is greater than*" where "*greater than*" represents adding some value(s) and the phrase "*is greater than*" represents an inequality. The same goes for "*less than*" phrases.

"*Six **greater than** five*" would translate to "$6+5$"

Whereas

"*A number **is greater than** four*" would translate to "$x>4$".

EXAMPLE

It is helpful to translate the words into symbols first.

Twice a number *less than* four *is equal to* six *times* a number *plus* five.

| 2 | | *n* | | – | | 4 | | = | | 6 | × | *n* | | + | | 5 |

REVERSE THE ORDER WHERE
THERE IS A "LESS THAN"

So, we can translate this into the equation → $4 - 2n = 6n + 5$

Note:
The one thing to be clear about is "and" has no direct translation. We might have used the phrase "two and three is five" to mean 2 + 3 = 5. However, "and" is used to link two items and depending on the word in front, "and" will be replace by the appropriate symbol.

For example:

Sum of 2 and a number   *Difference of 4 and a number*
2 + x   *4 – x*

Product of 6 and a number   *Quotient of a number and ten*
6x   *n ÷ 10*

NOW TRY SOME ON YOUR OWN…

1) If a number is **increased** by the ***product of*** the number ***and*** ten, the **result is** the number *squared* **plus** five.

Note:
When there is a product of more than one item, parenthesis is used.
For example: *Seven times the sum of a number and four*   **translates to** → $7(x + 4)$

2) The **difference of** six **and** three *times* the **sum of** five **and** a number **is** nine **less than** the number.

ANSWERS: **1)** $x + 10x = x^2 + 5$,   **2)** $6 - 3(5 + x) = x - 9$