

# Math with Bases

With [your previous help](#), Little Ben managed to get a perfect score on his homework. He came running home to show his brother, Big Ben. Big Ben had done this type of thing before, you see, so he naturally wasn't too impressed. Big Ben boasted, "Back in my day, we had to multiply and divide as well, the numbers were much bigger, AND we had to do it in base 64."

Little Ben became intrigued by this and searched the Internet for a worksheet. It turns out that his teacher made a worksheet for one of the higher grades that was just like Big Ben's. She also forgot to write what base each question was in... again!

According to the worksheet,

The digits used for Base 64 are the same as that of Base 62, with the single- and double-quotes as the last two; the digits used are  
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz".

## Input

The first line of input contains an integer  $n$  ( $1 < n < 64$ ) that indicates the amount of sections (test cases). Each test case is as follows:

$A - B = C$

|

$X_1 \text{ op } Y_1 =$

$X_2 \text{ op } Y_2 =$

...

$X_l \text{ op } Y_l =$

where  $A - B = C$  is the correct example,  $l$  ( $1 \leq l \leq 5000$ ) is the number of questions in that section,  $X_i$  and  $Y_i$  are the operands of each problem ( $0 < X, Y \leq 2^{100}$ ), and  $\text{op}$  is one of  $[+, -, *, \%]$ , denoting addition, subtraction, multiplication, or modulo.

## Output

Your program should output in the following format:

SECTION 1 (BASE b)

$X_1 \text{ op } Y_1 = Z_1$

$X_2 \text{ op } Y_2 = Z_2$

...

$X_i \text{ op } Y_i = Z_i$

SECTION 2 (BASE b)

$X_1 \text{ op } Y_1 = Z_1$

$X_2 \text{ op } Y_2 = Z_2$

...

$X_i \text{ op } Y_i = Z_i$

...

## SECTION N (BASE b)

$$X1 \text{ op } Y1 = Z1$$

$$X2 \text{ op } Y2 = Z2$$

...

$$Xi \text{ op } Yi = Zi$$

where  $Z_i$  is the solution to  $X_i \text{ op } Y_i$ , and  $b$  is the base used. ( $2 \leq b \leq 64$ ). *If the base is ambiguous, use the smallest base for which the example is correct and the questions are valid.*

### Example

#### Input:

4

$$K72Q - 9C5U = APRR$$

3

$$11JH4 - BMEB =$$

$$PB04 \% DQ9O =$$

$$F0GM - UQR0 =$$

$$A654A - 9A60E = AE3B$$

2

$$B94BA + 3460A =$$

$$123A29 \% 5E065 =$$

$$37CR - olh = 2KSm$$

5

$$157W \% 1blJ =$$

$$1P56 \% 1Eob =$$

$$1C6l * 1"uX =$$

$$1Ktc \% 1BMf =$$

$$20ne * 22V" =$$

$$BQfC - 4Kdb = 761H$$

2

$$9aFL * 3WU3 =$$

$$5fcV + 7fWL =$$

#### Output:

SECTION 1 (BASE 31)

$$11JH4 - BMEB = KS2O$$

$$PB04 \% DQ9O = BFLB$$

$$F0GM - UQR0 = -FQA9$$

SECTION 2 (BASE 15)

$$B94BA + 3460A = EDAC5$$

$$123A29 \% 5E065 = 5594E$$

SECTION 3 (BASE 64)

$$157W \% 1blJ = 157W$$

$$1P56 \% 1Eob = AIX$$

$$1C6l * 1"uX = 2O3gS"I$$

$$1Ktc \% 1BMf = 9Wz$$

$$20ne * 22V" = 46bA3EO$$

SECTION 4 (BASE 42)

$$9aFL * 3WU3 = bBafS4L$$

$$5fcV + 7fWL = DfTA$$

**Notes: large input/output data**