

### 2. DIOPHANTUS NOTATION 5 POINTS

**PROBLEM:** Diophantus (c. AD 255), considered by some as the father of algebra, first proposed a system of algebraic notation in his treatise *Arithmetica*. He used letters to form mathematical abbreviations. The following table, using modern letters, gives some examples:

TO REPRESENT	LETTERS USED
Unknown Number	X
Square	P
Cube	C
Fourth power	PP
Fifth power	PC
Sixth power	CC
Minus	M
A unit number	U

The expression PP2 C3 X5 M P4 U6 translates to  $2X^4 + 3X^3 + 5X - 4X^2 - 6$ . The PP2 means a term that is 2 times the variable to the fourth power. C3 means a term that is 3 times the variable to the third power. X5 means five times the variable. The M signifies that the remaining terms should be subtracted. Notice that the terms are not in descending order of the powers of X.

**INPUT:** 5 strings, each representing a Diophantus notation expression. There will be no blank spaces in the strings.

**OUTPUT:** For each string, print the algebraic expression in descending order of the powers of the variable. Use the ^ symbol to denote exponentiation.

**SAMPLE INPUT**

1. C3PP2X5MP4U6
2. PMU4
3. P3MX2U3

**SAMPLE OUTPUT**

1.  $2X^4 + 3X^3 - 4X^2 + 5X - 6$
2.  $X^2 - 4$
3.  $3X^2 - 2X - 3$