your special pdf

what's modular arithmetic ?

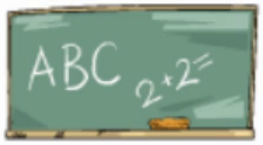
14%3=?

14%3=2

x%y=m

find the smallest non negative number m such that x-m is multiple of y

math behind modular arithmetic



14%3=2

x%y=m

4*3+2=14

q*y+m=x

23%6=? 5

2%2=? 0

4%5=? 4

0%2=? 0

1%0=? math error

12%6=? 0

cyclic

in the previous example num%5

0 1 2 3 4 5 6 7 8 9

0 1 2 3 4 0 1 2 3 4

you can easily see that if we want num%x our mod range from 0 to x-1

(a+b)%c=((a%c)+(b%c))%c

(a*b)%c=((a%c)*(b%c))%c

a%c in range 0 to c-1

b%c in range 0 to c-1

(a-b)%c=((a%c)-(b%c)+c)%c

(a/b)%c=((a%c)*(b^{-1} %c))%c