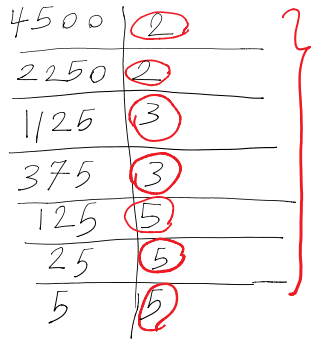
1. Number of divisors of 4500:



$4500 = 2^2 \times 3^2 \times 5^3$

if $N = p^a \times q^b \times r^c$

number of divisors $= (a+1)(b+1)(c+1)$

$(2+1)(2+1)(3+1) = 36$

even divisors = All − odd $= 36 - 12 = 24$

odd divisors $= (2+1)(3+1) = 12$

2. Number of zeros in n!:

$$mod(A \backslash B) + mod(A \backslash 25) + mod(A \backslash 125) + \cdots$$

$100! \Rightarrow (100 \backslash 5) + (100 \backslash 25) = 20 + 4 = 24$

3. Diophantine equation:

$$ax + by = 0$$

$$x = x_0 + t\frac{b}{gcd(a,b)} \Big\} \rightarrow t \in \mathbb{Z}$$

$$y = y - t\frac{a}{\quad}$$

$$y = y_0 - t\frac{a}{gcd(a,b)}$$

Where (x_0, y_0)

Note: the equation have answer if $gcd(a,b) | c$