## Counting

## Counting in Number Theory



Learn how to solve this *type* of problems, not just this problem.



Tip: Always write down intermediate steps.

- (1) How many positive divisors does 20 have?
  (Ref: 2481)
- (2) How many integer solutions does the equation (x+1)(y+1) = 25 have? (Ref. 2483)
- (3) Find the number of different rectangles that satisfy the following conditions:
  - (a) its area is 2015
  - (b) the lengths of all its sides are integers

(Ref: 2482)

- (4) How many positive integers, not exceeding 2015, are relatively prime to 2015? (Ref: 2506)
- (5) Let p be a prime number, computer  $\phi(p)$ .

  (Ref: 2507)
- (6) Let p be a prime number and n be a positive integer. Show that  $\phi(p^n) = p^n p^{n-1}$ .

  (Ref. 2508)
- (7) Compute  $\phi(5)$ ,  $\phi(6)$ , and  $\phi(30)$ . What relationship among these answers have you noticed?
- (8) Show that if a and b are relatively prime, then  $\phi(a)\phi(b) = \phi(ab)$ .

  (Ref. 2509)
- (9) How many fraction numbers between 0 and 1 are there whose denominator is 1001 when written in its simplest form?

(Ref 2723)