

Counting

# The Inclusion-Exclusion Principle

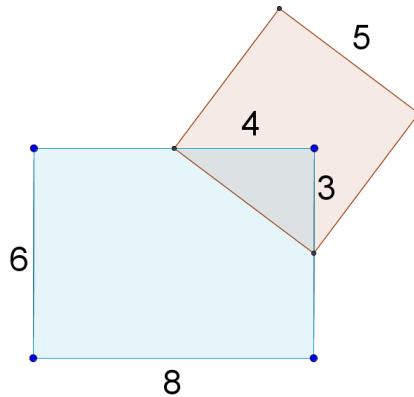


Learn how to solve this *type* of problems, not just this problem.



*Tip: Always write down intermediate steps.*

- (1) Why the inclusion-exclusion principle can be viewed as an extension to the addition principle?
- (2) How many numbers between 1 and 2015 are multiples of 3 or 4 but not 2015?  
(Ref: 2505)
- (3) What is the area that is covered by putting a  $8 \times 6$  rectangle and a  $5 \times 5$  square as shown on a table?  
(Ref: 2472)



- (4) How many different ways are there to assign 5 different tasks among 3 workers such that at least one worker does not receive any task?
- (5) Joe marks a stick in three different ways. The first is to mark the stick in 10 equal intervals. The second is to mark it in 12 equal intervals. And finally, he marks it in 15 equal intervals. If Joe cuts the stick at all those marks, how many segments will he get?  
(Ref 2724)
- (6) How many positive integers not exceeding  $10^6$  are there which are neither square nor cubic?  
(Ref 2725)
- (7) After having taken the same exam, Joe found he answered  $1/3$  of total problems incorrectly. Mary answered 6 incorrectly. The problems both didn't get right accounts for  $1/5$  of the total. Can you find how many problems did they both get right?  
(Ref 2729)