

6) How many ways are there to arrange John, Bill, Tom, Dick and Harry in a line if John must stand next to Bill?

Arrange John-Bill, T, D, H 4! ways

Arrange Bill-John, T, D, H 4!

Ans $4! + 4! = 24 + 24 = 48$

7) How many ways are there to arrange John, Bill, Tom, Dick and Harry in a line if John refuses to be first and Bill refuses to be second?

This problem is much like the phone # problem from Quiz on Feb. 3.

Either Bill is first or Bill isn't first.

If Bill first : $1 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 24$

If Bill isn't first : $3 \cdot 3 \cdot 3 \cdot 2 \cdot 1 = 54$

↑ ↖
Not John or Bill Not 1st 2nd or Bill

$24 + 54 = 78$