

Quiz 8 - Math 374, Frank Thorne (thorne@math.sc.edu)

Friday, November 3, 2017

(1) Of a company's personnel, 7 work in design, 4 in testing, and 5 in sales. A committee of three people is to be made.

(a) In how many ways can the committee be formed?

Solution. 16 people, choose any 3 of them in $C(16, 3)$ ways.

(b) In how many ways can the committee be formed if there is to be exactly one member from each department?

Solution. This can be done using the multiplication rule, $7 \times 4 \times 5$. (Note that $C(n, 1) = n$ for all n , it's okay if you wrote $C(7, 1) \times C(4, 1) \times C(5, 1)$).

(c) In how many ways can the committee be formed if design is to have at least one representative?

Solution. There are $C(16, 3)$ ways to choose total, $C(9, 3)$ ways to choose committees without any designers, so $C(16, 3) - C(9, 3)$.

Alternative solution. There are $C(7, 1) \cdot C(9, 2)$ ways to choose with exactly one designer, $C(7, 2) \cdot C(9, 1)$ to choose with exactly two designers, and $C(7, 3)$ to choose exactly three designers. So we also have

$$C(16, 3) - C(9, 3) = C(7, 1) \cdot C(9, 2) + C(7, 2) \cdot C(9, 1) + C(7, 3).$$

For this question, you don't need to simplify your answers.