

1. How many integer solutions are there to the equation

$$A + B + C + D = 17$$

$$A, B, C, D > 0$$

$$0 < A, B, C, D \leq 17$$

$$1 \leq A, B, C, D \leq 17$$

$$0 \leq A, B, C, D \leq 16$$

$$\binom{16}{3} = \frac{16!}{13! \cdot 3!} = \frac{16 \cdot 15 \cdot 14}{3 \cdot 2}$$

$$= 8 \cdot 5 \cdot 14$$

$$= 40 \cdot 14$$

$$= 560 *$$

2. Suppose there are 20 bags, each containing a $\$5$ coin and a $\$7$ coin. If we can use at most one coin from each bag, in how many different ways can we pay $\$17$, assuming that all coins are distinguishable (i.e. the $\$5$ coin from the first bag is considered to be different from that in the second bag, and so on). Formulate the problem using a generating function.

3420

$$(1 + x^5 + x^7)^{20}$$

Find coefficient of x^{17}

$$\binom{20}{2} \text{ for } x^5$$

$$18 \text{ for } x^7$$

$$\therefore \text{Ans } \binom{20}{2} 18 = 3420 \text{ ways} *$$