

CS 441: Discrete Structures for Computer Science
Spring 2020

Recitation on 6.3, 6.4, 6.5

Name: _____ Username (abc123): _____

Recitation: Thursday 12:00–12:50

1. Find the value of each of these quantities.

(a) $P(6, 3)$

(b) $C(5, 1)$

(c) $P(8, 5) + C(5, 3)$

2. A coin is flipped 10 times where each flip comes up either heads or tails. How many possible outcomes

(a) are there in total?

(b) contain exactly two heads?

(c) contain at most three tails?

3. Find the expansion of the following binomials.

(a) $(x + y)^3$

(b) $(s + t)^5$

4. Compute the following values using Pascal's Identity for $C(n, r)$.

(a) $C(6, 4)$

(b) $C(7, 5)$

5. How many strings of six letters are there

- (a) if letters are replaced?
- (b) if letters are NOT replaced?

6. How many ways are there to

- (a) distribute six indistinguishable objects into nine distinguishable boxes?
- (b) distribute six distinguishable balls into four indistinguishable boxes?

FORMULAS

$$(x + y)^n = \sum_{j=0}^n C(n, j) x^{n-j} y^j \quad (1)$$

$$C(n, 0) = C(n, n) = 1 \text{ and } C(n + 1, k) = C(n + 1, k - 1) + C(n, k) \quad (2)$$

$$\sum_{j=1}^k S(n, j) = \sum_{j=1}^k \frac{1}{j!} \sum_{i=0}^{j-1} (-1)^i C(j, i) (j - i)^n \quad (3)$$

$$P(n, r) = \frac{n!}{(n - r)!} \quad (4)$$

$$C(n, r) = \frac{n!}{(n - r)! r!} \quad (5)$$

$$(6)$$