

MATH 119: QUIZ 2 FORMULA SHEET

KUNIYUKI – FALL 2019

These will be given to you on Quiz 2. You will need to understand them, though!

Probabilities for Events Involving Equally Likely Outcomes (“elos”)

$$P(A) = \frac{\# \text{ of elos for which } A \text{ occurs}}{N}$$

Complementary Probabilities

$$P(\text{not } A) = P(\bar{A}) = P(A^c) = 1 - P(A)$$

Addition Rule for Mutually Exclusive Events (“mees”)

$$P(A \text{ or } B) = P(A) + P(B)$$

General Addition Rule

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Multiplication Rule for Independent Events

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

$$P(A \text{ and } B \text{ and } C) = P(A) \cdot P(B) \cdot P(C)$$

General Multiplication Rule

$$P(A \text{ and } B) = P(A) \cdot P(B|A)$$

$$P(A \text{ and } B \text{ and } C) = P(A) \cdot P(B|A) \cdot P(C|A \text{ and } B)$$

Conditional Probabilities

$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

$$P(B|A) = \frac{\#(A \text{ and } B)}{\#(A)} = \frac{\# \text{ of trials (or "elos") in which } A \text{ and } B \text{ occur}}{\# \text{ of trials (or "elos") in which } A \text{ occurs}}$$

(SEE NEXT PAGE!)

Expected Value (or Mean) of a Probability Distribution

$$E(X), \text{ or } \mu = \sum P(x) \cdot x, \text{ or } \sum x \cdot P(x)$$

Variance and Standard Deviation of a Probability Distribution

• (NOT ON QUIZ 2)

$$VAR(X), \text{ or } \sigma^2 = \sum (x - \mu)^2 \cdot P(x), \text{ or } E(X^2) - \mu^2$$

$$SD(X), \text{ or } \sigma = \sqrt{VAR(X)}$$

Full (or Complete) Permutations of n Distinct Items

$${}_n P_n = n!$$

(Other) Partial Permutations of n Distinct Items, Taken r at a Time

• (NOT ON QUIZ 2)

$${}_n P_r = \frac{n!}{(n-r)!}$$

Combinations of n Distinct Items, Taken r at a Time; Binomial Coefficients

$${}_n C_r, \text{ or } \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Binomial Probability Formula

• (NOT NEEDED ON QUIZ 2, BUT MAY HELP WITH CHECKING)

$$P(x) = {}_n C_x p^x q^{n-x}, \text{ or } \binom{n}{x} p^x q^{n-x}$$