

# Extra Practice 1

3/3/2019

1. In how many ways can  $n$  people sit around a round table? Count A seated to the left of B as different from B seated to the left of A. *Hint: if everyone shifts the same number of seats in the same direction, it's the same arrangement.*
2. The pmf of random variable  $x$  is  $p(x) = 0.05x$  for all integers  $[1, 4]$ ,  $0.05x - 0.2$  for all integers  $[5, 8]$ , and 0 otherwise. Determine the cdf,  $F(x)$ , including all values of  $x$  for which  $F(x)$  is defined. Then, find the following:
  - a.  $P(3 \leq x \leq 7)$
  - b.  $P(3 \leq x < 7)$
  - c.  $P(3 < x \leq 7)$
  - d.  $P(3 < x < 7)$
3. Suppose that the temperature of the ocean in a particular area is known to be normally distributed with mean 60 degrees and standard deviation of 7 degrees. If  $X$  = the temperature of one reading taken from this area, find:
  - a.  $P(X \leq 53)$
  - b.  $P(X \leq 44)$
  - c.  $P(X \geq 70)$
4. If I am a safety inspector for a paint production plant, and the probability that a paint color does not meet expectations is  $p = .05$ , what is the probability that I will inspect 10 good paint colors before 3 poor ones?
5. Robbins Bakery sells croissants. The pmf for daily sales is:  
 $X$  = daily croissant sales (in dozens)

$x$	$p(x)$
0	.1
1	.1
2	.3
3	.4
4	.1

The retail price of the croissants is \$30/dozen. The cost to produce each item is half of that. What is the expected daily profit for Robbins Bakery?

6. An American roulette wheel has 38 numbers upon which you can bet. 2 are green, 18 are black, and 18 are red. Each number is equally likely to be chosen.
  - a) You pay \$1 to bet on one number. If you win you get \$35 plus the original dollar that you bet. What are your expected winnings on each game?
  - b) You pay \$1 to bet on red or black. If you win you get \$1 plus the original dollar that you bet. What are your expected winnings on each game?
  - c) You pay \$1 to bet on green. If you win you get \$17 plus the original dollar that you bet. What are your expected winnings on each game?

**Challenge problems (beyond the level of this class)**

7. A fair coin is tossed 12 times. What is the probability that no two consecutive tosses are heads?
8. Suppose we toss a fair coin 20 times. Annie wins if there are odd number of heads and Ben wins if there are even number of heads. What is the probability that Ben will win? (This is more a reasoning than a calculating question, though you can use R to figure it out.)