Kaleb Burris
STAT F300 Statistics, Dr. Short
Worksheet 5, Wednesday due 1 February, 4:15pm

1.

Words with 3 distinct letters.

(a)

How many 12 letters words can be formed using 3 R's, 5 G's, and 4 B's? (Be sure to state the three tasks required to form these words.)

$$\text{Task 1: Assign the 3 R's} = n_1 = \binom{12}{3} = \frac{12!}{3!(12-3)!} = \frac{12!}{3!(9!)} = \frac{(12)(11)(10)}{3!} = \frac{1{,}320}{6} = 220$$

$$\text{Task 2: Assign the 5 G's} = n_2 = \binom{9}{5} = \frac{9!}{5!(9-5)!} = \frac{9!}{5!(4!)} = \frac{(9)(8)(7)(6)}{4!} = \frac{3{,}024}{24} = 126$$

$$\text{Task 3: Assign the 4 B's} = n_3 = \binom{4}{4} = 1$$

$$n = (n_1)(n_2)(n_3) = (220)(126)(1) = \boxed{27{,}720}$$

(b)

How many of these words start with an R and end with a B?

$$\text{Task 1: Assign the first character as R} = n_1 = \binom{12}{1} = 12$$

$$\text{Task 2: Assign the last character as B} = n_2 = \binom{11}{1} = 11$$

$$\text{Task 3: Assign the remaining R's} = n_3 = \binom{10}{2} = \frac{10!}{2!(10-2)!} = \frac{10!}{2!(8!)} = \frac{(10)(9)}{2!} = \frac{90}{2} = 45$$

$$\text{Task 4: Assign the 5 G's} = n_4 = \binom{8}{5} = \frac{8!}{5!(8-5)!} = \frac{8!}{5!(3!)} = \frac{(8)(7)(6)}{3!} = \frac{336}{6} = 56$$

$$\text{Task 5: Assign the remaining B's} = n_5 = \binom{3}{3} = 1$$

$$n = (n_1)(n_2)(n_3)(n_4)(n_5) = (12)(11)(45)(56)(1) =$$