Finite Mathematics (Math 10120), Spring 2018

Name: **SOLUTIONS**

1. The following table shows the distribution of grades of 20 students on a recent Psychology exam. The mean score on the exam was 84. Find the **population** variance and standard deviation of the scores.

   You do not need to verify that the mean is 84. You may use the empty columns for your work (it may not be necessary to use all of them).

Grade	# of students	Grade−mean	(Grade−mean)^2	#×(G−m)^2	
81	6	−3	9	54	
83	4	−1	1	4	
86	8	2	4	32	
87	2	3	9	18	

Total 20

Total 108

$$\text{Pop. Variance} = \frac{108}{20} = 5.4; \quad \text{Pop std dev} = \sqrt{5.4} \approx 2.32$$

2. Suppose a bag has 3 red balls and 4 blue balls. Consider the following experiment: I pick balls (without replacement) from the bag until I have 2 balls that have the same color (i.e., I have either 2 red balls or 2 blue balls).

   Let X be the total number of balls that I pick. Find the probability distribution of X. (Hint: First draw a tree diagram).
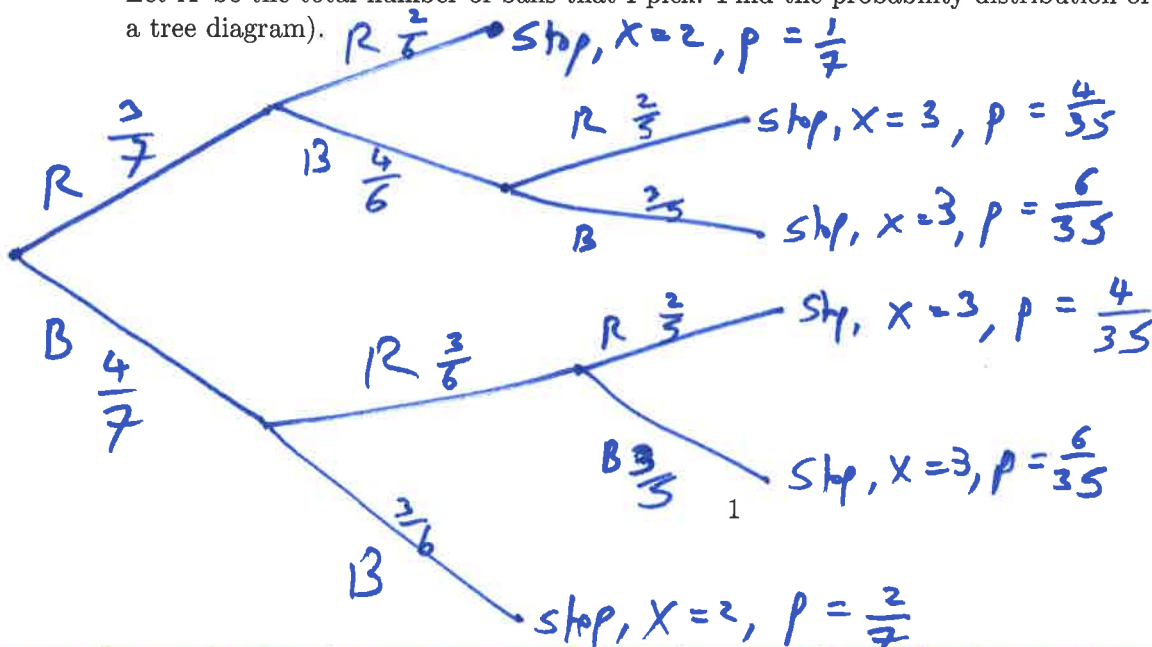
$R\ \frac{2}{6}$ → Stop, $X=2$, $p=\frac{1}{7}$

$R\ \frac{2}{5}$ → stop, $X=3$, $p=\frac{4}{35}$

$B\ \frac{3}{5}$ → stop, $x=3$, $p=\frac{6}{35}$

$R\ \frac{2}{5}$ → Stop, $X=3$, $p=\frac{4}{35}$

$B\ \frac{3}{5}$ → Stop, $X=3$, $p=\frac{6}{35}$

stop, $X=2$, $p=\frac{2}{7}$

$R\ \frac{3}{7}$

$B\ \frac{4}{6}$

$B\ \frac{4}{7}$

$R\ \frac{3}{6}$

$\frac{3}{6}$

B

Table:

k	$P(X=k)$
2	$\frac{1}{7}+\frac{2}{7} = \boxed{\frac{3}{7}}$
3	$\frac{4}{35}+\frac{6}{35}+\frac{4}{35}+\frac{6}{35} = \frac{20}{35} = \boxed{\frac{4}{7}}$