Assignment 1

STAT463

1. Consider the bivariate random variable (S, P). Explicitly write out the joint pmf for (S, P). **– 4 points**

$$p_{S,P}(s,p) = \begin{cases} \frac{1}{36} & (2,1),(4,4),(6,9),(8,16),(10,25),(12,36) \\ \frac{1}{18} & (x,y) \in x_{SP} \\ 0 & else \end{cases}$$

Where
$X_{SP} = (3,2),(4,3),(5,4),(6,5),(7,6),(5,6),(6,8),(7,10),(8,12),(7,12),(8,15),(9,18),(9,2$

2. Explicitly write out the marginal pmf of S. **– 2 points

3. Explicitly write out the marginal pmf of P. **– 2 points**

4. Calculate E[S]. **– ½ point**

$$\begin{aligned} E(S) = 2 \times \frac{1}{36} + 3 \times \frac{1}{18} + 4 \times \frac{1}{12} + 5 \times \frac{1}{9} \\ + 6 \times \frac{5}{36} + 7 \times \frac{1}{6} + 8 \times \frac{5}{36} + 9 \times \frac{1}{9} \\ + 10 \times \frac{1}{10} + 11 \times \frac{1}{18} + 12 \times \frac{1}{36} \end{aligned}$$

5. Calculate E[P]. **– ½ point**

6. Calculate Cov[S, P]. **– 1 point**

7. Calculate Var[P]. **– ½ point**

8. Explicitly write out the conditional pmf of P given S = 7 . **– 1.5 points**

9. Calculate E[P|S = 7]. **– ½ point**

10. Calculate Var[P|S = 7]. **– ½ point**