

# Homework #4 solutions: MA 204

- 4.18**
- Part A is a 4 x 4 table with  $\frac{1}{16}$  as the outcome in every combination of  $X, Y$
  - Part B:  $\frac{5}{8}$
  - Part C: This is a 4 x 4 table with  $\frac{1}{12}$  as all of the off-diagonal elements and 0 as the diagonals
  - Part D:  $\frac{1}{2}$
- 4.26** Since  $X$  and  $Y$  are independent,  $V[2X - 3Y + 4] = 4V[X] + 9V[Y] = 4c + 9d$
- 4.40**
- $V[3X^2 + Y] = 9V[X^2] + V[Y] = 9E[(X^2)^2] - E[X^2]^2 + E[Y^2] - E[Y]^2 = 103.$
  - $E[X^4 Y^4] = E[X^4]E[Y^4] = (15)(94) = 1410.$
  - $Cov(X, X^2) = E[XX^2] - E[X]E[X^2] = E[X^3] - E[X]E[X^2] = 5 - (1)(2) = 3.$
  - $V[X^2 Y^2] = E[(X^2 Y^2)^2] - E[(X^2 Y^2)]^2 = E[X^4]E[Y^4] - E[X^2]^2 E[Y^2]^2 = 1266.$