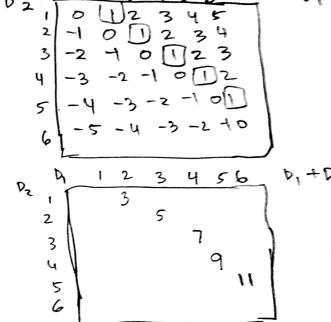
1. Suppose you roll two dice, and call their outcomes D_1 and D_2 . Find the expected value of their sum, $D_1 + D_2$ given that the difference $D_1 - D_2$ is 1. That is, find $E(D_1 + D_2 | D_1 - D_2 = 1)$. $E \begin{bmatrix} D_1 + D_2 \\ D_1 - D_2 \end{bmatrix} = \begin{bmatrix} D_1 + D_2 \\ D_1 \end{bmatrix}$

$$E[D_1 + D_2 | D_1 - D_2 | = 1]$$

$$(+D_2) P(d_1,d_2) = \frac{1}{5} \cdot 3 + \frac{1}{5} \cdot 5 + \frac{1}{5} \cdot 7 + \frac{1}{5} \cdot 9 + \frac{1}{5} \cdot 11$$

$$= \frac{1}{5} (3+5+7+9+11) \qquad \frac{27}{15}$$

$$= \frac{42}{5}$$



restricted DL

2. Prove that for two independent random variables X and Y,

Var (xy) =
$$E[X^2]E[Y^2] - (E[X])^2(E[Y])^2$$
. $E[XY] = E[X]E[Y^2]$
Var (xy) = $E[X^2]E[Y^2] - (E[X])^2(E[Y])^2$. $E[XY] = E[X] = E[X]$
Var (xy) = $E[X^2]E[Y^2] - (E[X])^2(E[Y])^2$. $E[XY] = E[XY] = E[XY]$