# Student Information

Name : Göktuğ Ekinci

ID : 2380343

# Answer 1

## a)

**Blue:** $2 \times \frac{4}{6} + 3 \times \frac{1}{6} + 4 \times \frac{1}{6} = \frac{15}{6} = 2.5$

**Yellow:** $1 \times \frac{1}{3} + 2 \times \frac{1}{3} + 3 \times \frac{1}{3} = \frac{6}{3} = 2$

**Red:**$1 \times \frac{2}{8} + 2 \times \frac{2}{8} + 3 \times \frac{3}{8} + 5 \times \frac{1}{8} = \frac{20}{8} = 2.5$

## b)

These dice rolls are independent from each other. So we can add their expected values. I would choose the first combination below for the maximum value since its expected value is bigger.

**2 red and 1 yellow:** $2.5 + 2.5 + 2 = 7$

**2 yellow and 1 blue:** $2 + 2 + 2.5 = 6.5$

## c)

If blue dice is guaranteed to resulted with 4, I would choose the second combination above since the expected value of blue dice will turn into 4. Total expected value of second combination above would be higher.

## d)

We have to compute the probability of red dice gives three and divide it to the space of giving 3's. The probability of red dice gives 3 is: $\frac{3}{8}$. Space of giving 3's is: $\frac{3}{8} + \frac{2}{6} + \frac{1}{6} = \frac{7}{8}$.

Answer is: $\frac{\frac{3}{8}}{\frac{7}{8}} = \frac{3}{7}$

### e)

Probabilities are where the **yellow turns 1 and red turns 5** and **both turns 3**.
$\frac{2}{6} \times \frac{1}{8} + \frac{2}{6} \times \frac{3}{8} = \mathbf{\frac{1}{6}}$

## Answer 2

### a)

The asked situation is P(A=0,I = 2), which is the third row from the table. **0.17**

### b)

This situation is impossible. All possibilities are given in the table. We know there is no more possibilities since the values are summed to 1. Answer is **0**

### c)

All rows are dependent to each other, so we need to sum the possibilities of 2 outages in total, which are P(A=0,I = 2), P(A=1,I = 1) = 0.17 + 0.11 = **0.28**.

### d)

This is P(A=1, I = i) $\rightarrow$ 0.12 + 0.11 + 0.22 + 0.15 = **0.6**

### e)

We need to repeat part c for every possible situations, from 0 to 4.

0 = P(A=0, I=0) = 0.08
1 = P(A=1, I=0) + P(A=0, I=1) = 0.25
2 = P(A=0, I=2) + P(A=1, I=1) = 0.28
3 = P(A=0, I=3) + P(A=1, I=2) = 0.24
4 = P(A=1, I=3) = 0.15

Sum of all values are 1, which proves the solution.

### f)

One outage for Istanbul possibility is 0.11 + 0.13 = 0.24. One outage for Ankara possibility is 0.6 from part d. If we assume that they are independent, P(A=1, I=1) would be equal to 0.144. It can be seen that the possibility of P(A=1, I=1) = 0.11 $\neq$ 0.144. This shows they are independent events.