Student Information

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Answer 1

a)

Expected values of Blue, Yellow and Red dies are:
Blue: $(2 * 4 + 3 + 4)/6 = 2.5$
Yellow: $(1 * 2 + 2 * 2 + 3 * 2)/6 = 2$
Red: $(1 * 2 + 2 * 2 + 3 * 3 + 5 * 1)/8 = 2.5$

b)

Expected Values of "2 red 1 yellow" and "2 yellow 1 blue" are:
2 red 1 yellow: $2 * 2.5 + 2 = 7$
2 yellow 1 blue: $2 * 2 + 2.5 = 6.5$

I would choose 2 red 1 yellow because its expected value is higher.

c)

if blue die was a guaranteed 4 it's expected value would also be 4 in this case the new expected value would be:
2 yellow 1 NEW BLUE: $2 * 2 + 4 = 8$
and I would choose 2 yellow 1 blue since its new expected value is higher then 2 red 1 yellow,

d)

$P(R|3) =?$
$P(3|B) = 1/6$
$P(3|Y) = 1/3$
$P(3|R) = 3/8$
$P(3) = P(3 \cap B) + P(3 \cap Y) + P(3 \cap R)$
$= P(3|B)P(B) + P(3|Y)P(Y) + P(3|R)P(R) = 1/6 * 1/3 + 1/3 * 1/3 + 3/8 * 1/3$
$= P(3) = 7/24$
$P(R|3) = P(3|R) * P(R)/P(3) = 3/8 * 1/3/(7/24) =$ **3/7**
If it is known that the value of the die is 3, the probability that the rolled die is red is: **3/7**

e)

$P(RY = 6) =$? possibilies are:
R=5,Y=1
R=3,Y=3

$P\{RY = 6\} = (P\{R = 5\} \cap P\{Y = 1\}) \cup (P\{R = 3\} \cap P\{Y = 3\}) =$
$P\{R = 5\} * P\{Y = 1\} + P\{R = 3\} * P\{Y = 3\} = 1/8 * 1/3 + 3/8 * 1/3 =$ **1/6**
The probability that the total value will be 6 when a single red die and a single yellow die is rolled together is **1/6**

Answer 2

a)

0.17

b)

0

c)

$0.17 + 0.11 = 0.28$

d)

$0.12 + 0.11 + 0.22 + 0.15 = 0.6$

e)

we have from 0 to 4 outages at total lets first calcualte each case:
$P\{OUTAGE = 0\} = P(A = 0, I = 0) = 0.08$
$P\{OUTAGE = 1\} = P(A = 0, I = 1) + P(A = 1, I = 0) = 0.12 + 0.13 = 0.25$
$P\{OUTAGE = 2\} = P(A = 0, I = 2) + P(A = 1, I = 1) = 0.17 + 0.11 = 0.28$
$P\{OUTAGE = 3\} = P(A = 0, I = 3) + P(A = 1, I = 2) = 0.02 + 0.22 = 0.24$
$P\{OUTAGE = 4\} = P(A = 1, I = 3) = 0.15$

count	P{OUTAGE=count}
0	0.08
1	0.25
2	0.28
3	0.24
4	0.15

f)

if for all values of a and iP(a)*P(i)=P(a∩i) then they are independent; otherwise they are dependant

a\i	0	1	2	3	P{A=a}
0	0.08	0.13	0.17	0.02	0.4
1	0.12	0.11	0.22	0.15	0.6
P{I=i}	0.2	0.24	0.39	0.17	

Lets check if it is independent according to data above
$0.4 * 0.2 = 0.08$ 0 0 holds
$0.6 * 0.2 = 0.12$ 1 0 holds
$0.4 * 0.24 = 0.096 \neq 0.08$ 0 1 does not hold
which means the electric outages in Ankara and Istanbul are **dependent**