Q1)

a)

P(S=3|D2)*P(D2) / P(S=3) = ?

P(S=3) = P(S=3|D1)*P(D1) + P(S=3|D2)*P(D2) + P(S=3|D3)*P(D3)

= 1/6 + 2*((1/6)^2)*((1/2)^2) + (1/6)^3*(1/2)^3

= 169/(12^3)

P(S=3|D2)*P(D2) = 2*((1/6)^2)*((1/2)^2) = 1/72

⇨ ? = 24 / 169

b)

P(S=5|D2)*P(D2) + P(S=5|D4)*P(D4) / P(S=5) = ?

P(S = 5) = P(S=5|D1)*P(D1) + P(S=5|D2)*P(D2) + P(S=5|D3)*P(D3) + P(S=5|D4)*P(D4) + P(S=5|D2)*P(D2)

= 1/12 + (1/72) + (1/(72*6)) + (1/(72*72)) + (1/(72*72*96))

P(S=5|D2)*P(D2) + P(S=5|D4)*P(D4) = (1/72) +(1/(72*72))

⇨ ? = 7008 / 49633

c)

$P(S=5|D2|Dice1 = 2)*P(D2) / P(S = 5) = ?$

$P(S = 5) = P(S=5|D1)*P(D1) + P(S=5|D2)*P(D2) + P(S=5|D3)*P(D3) + P(S=5|D4)*P(D4) + P(S=5|D2)*P(D2)$

$= 1/12 + (1/72) + (1/(72*6)) + (1/(72*72)) + (1/(72*72*96))$

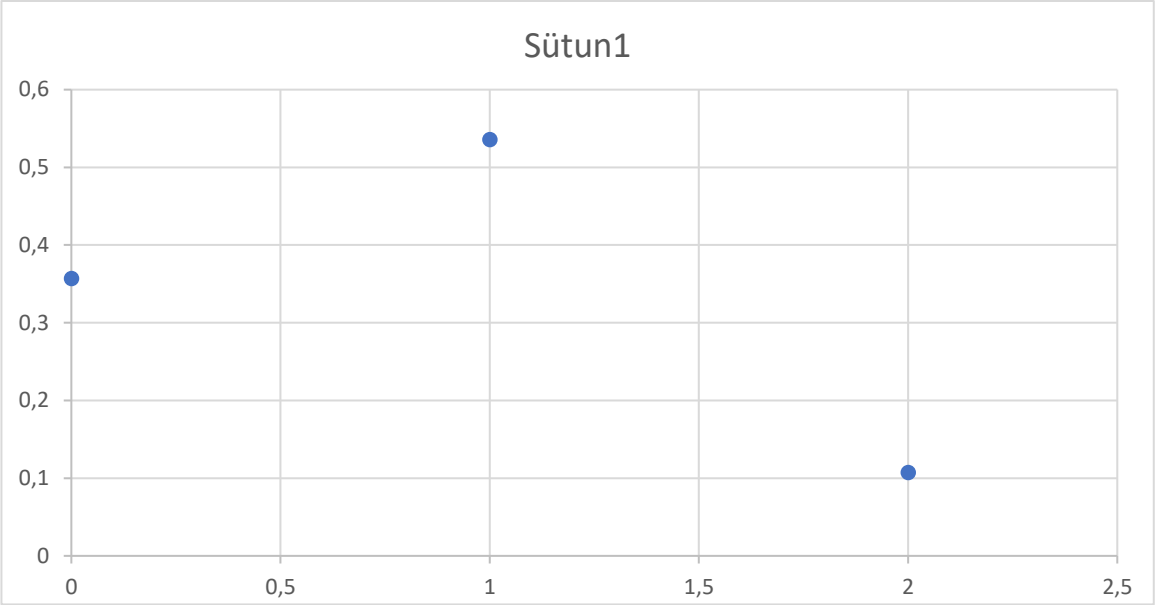
$P(S=5|D2|Dice1 = 2)*P(D2) = 1/144$

⇨ $? = 3456 / 49633$

d)

Q2)

1)



2)

F(a) = f(0) + f(1) + … + f(a)

P(a < x < b) = F(b) – F(a)

a)

P(X = 0) = P(0 <= x <= 0) = F(0) – F(0) = 0

b)

P(0 < x < 2) = F(2) – F(0)

F(2) = 1, F(0) = 20/56 => P = 36 / 56

Q3)

$[-\infty, +\infty]\int f(x)dx = 1$ and $[a, b]\int f(x)dx = P(a < x < b)$

a)

$[1, +\infty]\int f(x)dx = [-c*(x^{-4})/4]\ [1, +\infty] = 1$

⇨ $c = 4$

b)

$F(x) = [1, +\infty]\int x*f(x)dx = [-c*(x^{-3})/3]\ [1, +\infty]$

⇨ $F(x) = \{ 0, x < 1$

$= \{-c/(3*x^3), x >= 1$

c)

$P(x>2) = F(+\infty) - F(2)$

$= 0 - (-c/24) = c/24$

Q4)

a)

$g(x) = [0,1] \int(x-y)dy = [xy - y^2/2][0,1] \Rightarrow g(x) = x - ½$

$h(y) = [2,1] \int(x-y)dx = (x^2/2 - xy)[2,1] \Rightarrow h(y) = 3/2 - y$

b)

$f(x,y) =? g(x)*h(y) \Rightarrow x-y \neq (x - ½)*(3/2 - y)$

⇨ $f(x,y) \neq g(x)*h(y)$ => it is not independent !!!

c)

$f(x|y) = f(x,y) / h(y) = (x-y) / (3/2 - y)$

$P(x > 1.5|y = 0.5) = [1.5 , 2] \int (x-y) / (3/2 - y)\, dx$

$= [1.5 , 2] \int (x-0.5) / (3/2 – 0.5)\, dx = [(x^2/2) – (x/2)][1.5, 2]$

⇨ $P = 5/8$