

IMM - DTU

02405 Probability

2003-11-1

BFN/bfn

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Question b) We introduce the random variables Z_x

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$$P(Y = 0|X = 0)$$

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For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

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Question c) We find $P(X = x, Y = y)$

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Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$.

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X/Y	0	1	2	3
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X/Y	0	1	2	3
0	$\frac{1}{64}$			

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Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

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For $x = 1$ we get

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X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

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For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

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Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

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0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0)$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64},$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1)$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1) = \frac{9}{64},$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1) = \frac{9}{64}, P(Y = 2) = \frac{9}{64}, P(Y = 3) = \frac{1}{8}$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1) = \frac{9}{64}, P(Y = 2) = \frac{27}{64}, P(Y = 3) = \frac{27}{64}$$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1) = \frac{9}{64}, P(Y = 2) = \frac{27}{64}, P(Y = 3) = \frac{27}{64}$$

Question e) Using $P(X = x|Y = y)$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

Question b) We introduce the random variables Z_x with binomial distribution $b(3 - x, \frac{1}{2})$.

We can write $Y = x + Z_x$ for the conditional distribution of Y . For $x = 0$ we get

$$P(Y = 0|X = 0) = \frac{1}{8}, P(Y = 1|X = 0) = \frac{3}{8}, P(Y = 2|X = 0) = \frac{3}{8}, P(Y = 3|X = 0) = \frac{1}{8}$$

For $x = 1$ we get

$$P(Y = 1|X = 1) = \frac{1}{4}, P(Y = 2|X = 1) = \frac{1}{2}, P(Y = 3|X = 1) = \frac{1}{4}$$

For $x = 2$ we get

$$P(Y = 2|X = 2) = \frac{1}{2}, P(Y = 3|X = 2) = \frac{1}{2}$$

For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

Question c) We find $P(X = x, Y = y) = P(X = x)P(Y = y|X = x)$. The distribution table is

X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

Question d) We find the distribution of Y from the distribution table in the previous question

$$P(Y = 0) = \frac{1}{64}, P(Y = 1) = \frac{9}{64}, P(Y = 2) = \frac{27}{64}, P(Y = 3) = \frac{27}{64}$$

Question e) Using $P(X = x|Y = y) = \frac{P(X=x, Y=y)}{P(Y=y)}$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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$$P(X = 0|Y = 0) = 1$$

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Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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For $x = 2$ we get

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For $x = 3$ we get

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X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
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Question f) Best guess \hat{X}_y of $X|Y = y$

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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$Y = y$	0	1	2	3
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$$P(X = 0|Y = 0) = 1$$

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for $y = 2$

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Question f) Best guess \hat{X}_y of $X|Y = y$

$Y = y$	0	1	2	3
\hat{X}_y	0			

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

$$P(X = 0) = \frac{1}{8}, P(X = 1) = \frac{3}{8}, P(X = 2) = \frac{3}{8}, P(X = 3) = \frac{1}{8}$$

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For $x = 3$ we get

$$P(Y = 3|X = 3) = 1$$

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X/Y	0	1	2	3
0	$\frac{1}{64}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{64}$
1	0	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{32}$
2	0	0	$\frac{3}{16}$	$\frac{3}{16}$
3	0	0	0	$\frac{1}{8}$

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Question f) Best guess \hat{X}_y of $X|Y = y$

$Y = y$	0	1	2	3
\hat{X}_y	0	1		

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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For $x = 3$ we get

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3	0	0	0	$\frac{1}{8}$

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Question f) Best guess \hat{X}_y of $X|Y = y$

$Y = y$	0	1	2	3
\hat{X}_y	0	1	1 or 2	

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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$Y = y$	0	1	2	3
\hat{X}_y	0	1	1 or 2	2

Question a) X is binomially distributed $b(3, \frac{1}{2})$.

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