Probability Exercises Lecture 7

1.(a) $P(X=1|Y=1)=\frac{0.1}{0.19}=\frac{10}{19}$

$P(X=2|Y=1)=\frac{0.05}{0.19}=\frac{5}{19}$

$P(X=3|Y=1)=\frac{0.02}{0.19}=\frac{2}{19}$

$P(X=4|Y=1)=\frac{0.02}{0.19}=\frac{2}{19}$

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(b) $E(X|Y=2)=1\times\frac{5}{32}+2\times\frac{20}{32}+3\times\frac{5}{32}+4\times\frac{2}{32}=\frac{17}{8}$

(c) $E(X)=1\times0.19+2\times0.32+3\times0.31+4\times0.18=2.48$

(d) $E(X^2|Y=2)=1^2\times\frac{5}{32}+2^2\times\frac{20}{32}+3^2\times\frac{5}{32}+4^2\times\frac{2}{32}=\frac{81}{16}$

(e) $Var(X|Y=2)=E(X^2|Y=2)-E^2(X|Y=2)=\frac{81}{16}-(\frac{17}{8})^2=\frac{35}{64}$

2. $X\backslash Y$

(a) $P(Y=0|X=3)=\frac{0.04}{0.33}=\frac{4}{33}$

(b) $P(X=4|Y>1)=\frac{0.1}{0.27}=\frac{10}{27}$