Section 3.

1. $P(S=s|X=x) = \frac{P(X=x|S=s)\,P(S=s)}{P(x)}$

2. $X=AB$: (2,1) (2,3) (4,1) (4,3)

$X=AC$: (2,2) (2,3) (4,2) (4,3)

$X=BC$: (1,2) (1,3) (3,2) (3,3)

$\therefore P(S=5) = \frac{4}{12} = \frac{1}{3}$.

3. $P(c\text{ flipped}|S=5) = \frac{2}{4} = \frac{1}{2}$.

$P(c\text{ flipped}) = P(X=AC) + P(X=BC) = \frac{2}{3}$ $\therefore P(c\text{ flipped}|S=5) < P(c\text{ flipped})$.

4. $P(c\text{ flipped}|S=7) = \frac{1}{2}$.

$P(c\text{ flipped}|S=3) = \frac{1}{2} = P(c\text{ flipped}|S=7)$.

$P(c\text{ flipped}|S=4) = 1 > P(c\text{ flipped}|S=7)$.

$P(c\text{ flipped}|S=5) = \frac{1}{2} = P(c\text{ flipped}|S=7)$.

$P(c\text{ flipped}|S=6) = 1 > P(c\text{ flipped}|S=7)$

$P(c\text{ flipped}|S=7) < P(c\text{ flipped})$.