6-4.1
$$p(a_{ij}=1) = \frac{\#\text{links}}{\#\text{possible links}} = \frac{L}{\binom{N}{2}} = \frac{2L}{N(N-1)}$$

6-4.2
$$p(a_{ij}=1 \mid a_{xy}=0) = \frac{L}{\binom{N}{2}-1}$$

since for one of all possible links we know that there is no link. Therefore, #possible links -1 in the denominator but L links in the nominator.

$$p(a_{ij}=0 \mid a_{xy}=1) = \frac{L-1}{\binom{N}{2}-1}$$

since one link is already taken

6-4.3
$$r_0 = \frac{p(a_{ij}=1 \mid a_{xy}=0)}{p(a_{ij}=1)} = \frac{L}{\left(\frac{N(N-1)}{2}-1\right)} \cdot \frac{N(N-1)}{2L} = \frac{N(N-1)}{N(N-1)-2}$$

$$r_1 = \frac{(L-1)}{\left(\frac{N(N-1)}{2}-1\right)} \cdot \frac{N(N-1)}{2L} = \frac{(L-1)}{L} \cdot \frac{N(N-1)}{(N(N-1)-2)}$$

$$\rightarrow \frac{r_0}{r_1} = \frac{L}{L-1}$$

6-4.4 For $G(N,p) \Rightarrow p(a_{ij}=1) = p$

and $p(a_{ij}=1 \mid a_{xy}=0) = p(a_{ij}=0 \mid a_{xy}=1) = p$

$\rightarrow r_0' = 1$ and $r_1' = 1$ $\rightarrow$ $\frac{r_0'}{r_1'} = 1$

6-4.5 For $G(N,p)$ the probability of setting a link is not influenced.

For $G(N,L)$ the number of nodes and links is fixed. Therefore, for small N and L ~~the number of~~ the probability of assigning a new link strongly depends on previous setted links