The cumulative distribution function of the negative binomial distribution with parameters r and p is given by

$$F(t) = \begin{cases} 0, & \text{if } t < r \\ \displaystyle\sum_{x=r}^{[t]} f(x) = \sum_{x=r}^{[t]} \binom{x-1}{r-1} p^r q^{x-r}, & \text{if } t \geq r. \end{cases}$$

Plots of the probability function $f(x)$ and the cumulative distribution function $F(t)$ are presented in Figure 5.5 for some choices of r and p.

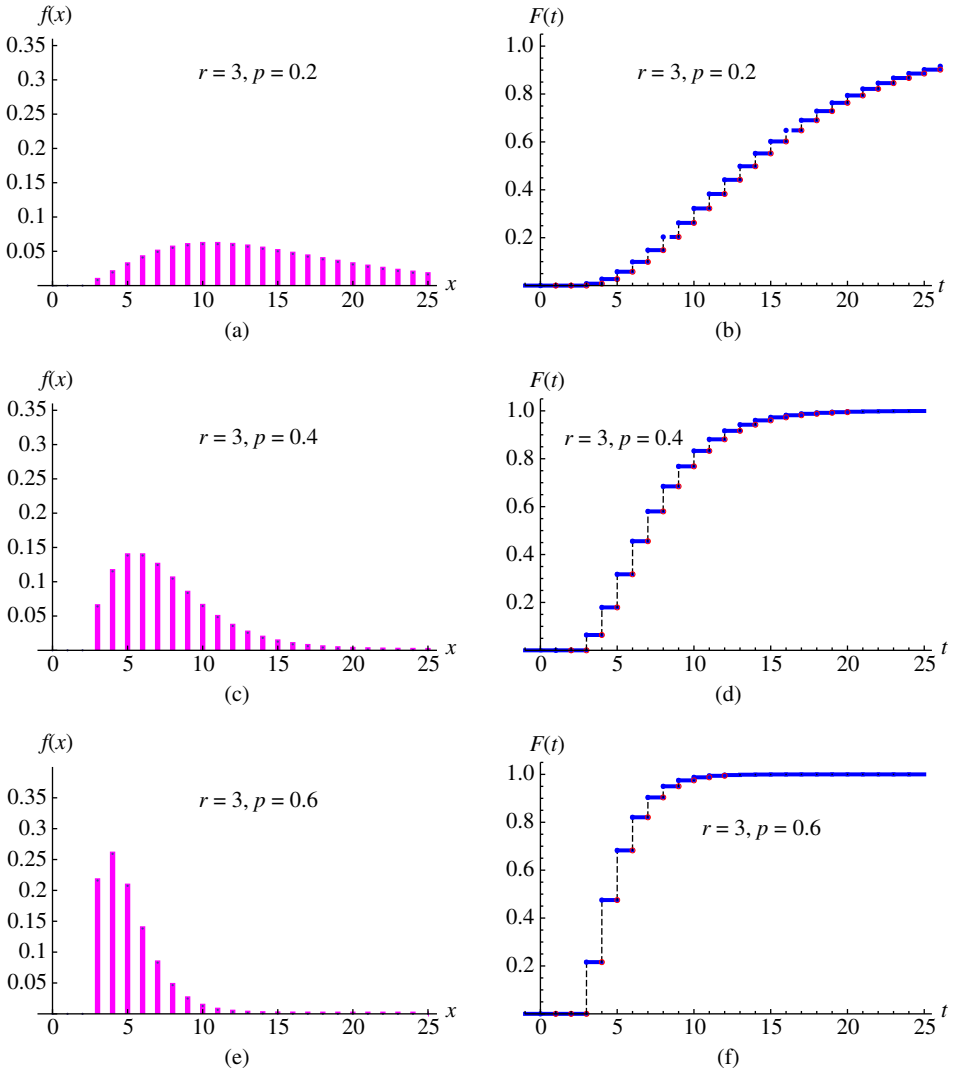

Figure 5.5 The probability function (left) and the cumulative distribution function (right) of the negative binomial distribution for some choices of r and p.