

MECH 6325 HW4

$$1) \quad n=3 \quad p=\frac{1}{6}$$

$$k=2$$

$$P(k=2) = \binom{3}{2} \left(\frac{1}{6}\right)^2 \left(1-\frac{1}{6}\right) = (3) \left(\frac{1 \times 1 \times 5}{6 \times 6 \times 6}\right) = \frac{15}{216}$$

$$P(k=2) = \frac{5}{72}$$

$$2) \quad P(k=k) = b_k^n = \binom{n}{k} p^k (1-p)^{n-k}$$

$$= \frac{n! p^k (1-p)^{n-k}}{(n-k)! k!}$$

$$3) \quad f_R(r) = \frac{r}{\sigma^2} e^{-\frac{r^2}{2\sigma^2}}, \quad r \geq 0$$

$$a) \quad F_R(r) = \int_{-\infty}^r f_R(r) dr = \int_0^r \frac{r}{\sigma^2} e^{-\frac{r^2}{2\sigma^2}}$$

$$= \frac{2\sigma^2}{-2r} \frac{r}{\sigma^2} e^{-\frac{r^2}{2\sigma^2}} \bigg|_0^r = 1 - e^{-\frac{r^2}{2\sigma^2}}$$

$$F_r(r) = 1 - e^{-\frac{r^2}{2\sigma^2}}$$