Tutorial 1: Answers
February 16-17, 2006

1. (a) $\dfrac{(25)(20)(15)(10)(5)}{\frac{25!}{20!}}$

    (b) $\dfrac{(25)(16)(9)(4)(1)}{\frac{25!}{20!}}$

2. (a) $a = 28$ and $E[X] = 0$.

    (b) $p_Z(z) = \begin{cases} \frac{z}{14} & , \quad \text{if } z = 0, 1, 4, 9 \\ 0 & , \quad \text{otherwise} \end{cases}$

    (c) $\text{var}(X) = 7$

3. (a)

$$
\begin{aligned}
E[U] &= aE[X_1] + bE[X_2] + c \\
E[V] &= a'E[X_1] + b'E[X_3] + c' \\
var(U) &= a^2 var(X_1) + b^2 var(X_2) \\
var(V) &= a'^2 var(X_1) + b'^2 var(X_3)
\end{aligned}
$$

   (b)

$$
\begin{aligned}
&= E[(U - E[U])(V - E[V])] \\
&= aa' var(X_1)
\end{aligned}
$$

$$
E[(U - E[U])(W - E[W])] = a'' b\, var(X_2)
$$