Name: \\
Date: \\

4.1 Two balls are chosen randomly from an urn containing 8 white, 4 black, and 2 orange balls. Suppose that we win $2 for each black ball selected and we lose $1 for each white ball selected. Let $X$ denote our winnings. Note that your winnings are -$2 if you get two white balls. Find the expected value of $X$.

\[
\begin{align*}
\Pr(x) = & \begin{cases} 
\binom{8}{2}/\binom{14}{2} & x = -2, \\
\binom{4}{2}/\binom{14}{2} & x = 0, \\
\binom{4}{1}/\binom{14}{2} & x = 1, \\
\binom{8}{1}/\binom{14}{2} & x = 2, \\
0 & \text{otherwise}
\end{cases}
\end{align*}
\]

\[
E(X) = -2 \binom{8}{2} - 1 + 3 + 2 \binom{8}{1} + 4 \binom{4}{2} / \binom{14}{2}
\]