

MATH 5010 – Quiz 8

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 .

$$P(x) = \begin{cases} \binom{8}{2} / \binom{14}{2} & x = -2, \\ \binom{2}{2} / \binom{14}{2} & x = 0, \\ \binom{4}{2} / \binom{14}{2} & x = 4, \\ \binom{8}{1} \binom{2}{1} / \binom{14}{2} & x = -1, \\ \binom{2}{1} \binom{4}{1} / \binom{14}{2} & x = 2, \\ \binom{8}{1} \binom{4}{1} / \binom{14}{2} & x = 1, \end{cases}$$

o o/w.

$$E(X) = \frac{-2 \binom{8}{2} - 1 \binom{2}{1} \binom{4}{1} + 0 + 3 \binom{2}{1} \binom{4}{1} + 2 \binom{8}{1} \binom{4}{1} + 4 \binom{4}{2}}{\binom{14}{2}}$$

$$= \boxed{0}$$