3: (6 pts.) Let X be the number of kings in a 5-card hand drawn from a well-shuffled deck of cards. Derive an expression for $P(0 < X < 2)$ but do not simplify it.

$$P(0 < X < 2) = P(X = 1)$$

$$= P_X(1) = \frac{\binom{4}{1}\binom{48}{4}}{\binom{52}{5}}$$

4: (4 pts.) Let W be a continuous RV with density function

$$f_W(w) = \begin{cases} c/w^2, & w \geq 1 \\ 0, & \text{elsewhere} \end{cases}$$

Prove or disprove: $E[W^2]$ exists.

$$E[W^2] = \int_1^\infty w^2 \cdot \frac{c}{w^2}\, dw = \int_1^\infty c\, dw = cw\Big|_1^\infty = \infty \quad \} 3$$

$\therefore$ $E[W^2]$ does not exist. 1