Midterm Exam #1 Formula Sheet

1. **Expected Value ($E(W)$) and Variance (σ_W^2):**
   - $E(W) = \sum_{s=1}^{n} p_s W_s$, where p_s = the probability of state s and W_s = state s wealth; and
   - $\sigma_W^2 = \sum_{s=1}^{n} p_s (W_s - E(W))^2$.
2. **Expected Utility ($E(U(W))$)**
   - $E\left(U(W)\right) = \sum_{s=1}^{n} p_s U(W_s)$, where $U(W_s)$ = state-contingent utility of wealth.
3. **Arrow-Pratt Risk Aversion Coefficients**
   - Absolute Risk Aversion: $R_A(W) = -U''(W)/U'(W)$; and
   - Relative Risk Aversion: $R_R(W) = W R_A(W)$.
4. **Certainty Equivalent of Wealth (W_{CE}) and Risk Premium (λ)**

   There are two methods for calculating W_{CE} and λ:
   - "Exact" method: 1) calculate $E(W)$ and $E\left(U(W)\right)$, 2) set $E\left(U(W)\right) = U(W_{CE})$ and solve for W_{CE}, and 3) $\lambda = E(W) - W_{CE}$.
   - "Approximate" method: 1) $\lambda = .5\sigma_W^2 R_A(E(W))$, and 2) $W_{CE} = E(W) - \lambda$.
5. **Stochastic Dominance Rules**

   If X_i stochastically dominates X_j, then $E(U(X_i)) > E(U(X_j))$ for all risk averse utility functions. Here are the formal definitions for first and second order stochastic dominance:
   - First Order Stochastic Dominance: Investment i First Order Stochastic Dominates (FOSD) investment j if $F(X_{j,s}) \geq F(X_{i,s})$ for all s.
   - Second Order Stochastic Dominance: Investment i Second Order Stochastic Dominates(SOSD) investment j if $\sum_{s=1}^{n} \left(F(X_{js}) - F(X_{is})\right) > 0$.