

Hwk 3 Project Valuation and Probability Review
Due in class on Wednesday 1/14

1) Suppose you got a job in LA and want to buy a new car. This being LA you narrow your choice to either a Prius (costs \$25k) or a Miata convertible (costs \$20k). The Prius gets roughly 50 mpg (miles per gallon) while the Miata gets 25. Suppose gas is \$2/gal. and you drive 15,000 miles a year. Use a 5% discount rate compounded monthly.

a) Which is the more economical choice assuming either car lasts 10 years? (We're ignoring salvage value, license fees, and repair costs here.)

b) Will you change your decision if the average gas price is \$3/gal?

c) At \$2/gal what is the more economical choice if you decide to sell the car after 5 years for half its original price?

2) Let Z_i be iid standard normal random variables. What is $\Pr[\frac{1}{30} \sum_{i=1}^{30} Z_i < 0.1]$?

3) Let $X_i \sim \text{Bernoulli}(p)$ be correlated random variables such that $\text{corr}(X_i, X_j) = q$ for any $i \neq j$. Let $Z = \sum_{i=1}^{1000} X_i$.

a) Calculate the mean and standard deviation of Z .

b) What is the standard deviation of Z if $q = 0$? if $q = 1$?