INR 3303 — Parametric Choice Exercise Solutions

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Remember: Ask yourself first whether any part of the problem is guaranteed to happen (100% probability), then determine the probability of each of the other things that *might* happen and multiply those probabilities by the relevant utilities.

Show the utility equation, as well as the answer, for each problem.

1. What is the expected utility of a promotion at your local grocery store that gives a coupon worth $10 to every fifth customer who comes into the store, assuming that you go to the store **twice** while the promotion is running.

   EU = 2 ($10 x .20) = ***$4***

2. What is the expected utility of betting $2 that you can draw a "club" out of a regular deck of 52 cards, assuming that you will win $16 if you succeed?

   EU = -$2 + ($16 x .25) + ($0 x .75) = -$2 + $4 + $0 = ***$2***

3. Suppose a friend offers to pay you $128 if you can flip a coin five times and get exactly the following sequence: Heads-Tails-Heads-Tails-Heads. If any other sequence occurs, however, you must, you must pay your friend $5. Calculate the expected utility of this situation. Should you take the bet?

   EU = ($128 x 1/32) + (-$5 x 31/32) = $4 - $4.84 = -$0.84
   You should not take this bet (since it has a negative expected utility).

4. Suppose you invest $10,000 in a business that promises to pay you a 20% return on your investment (i.e., $12,000) if the business succeeds. If the business fails, however, you will receive nothing. You estimate that there is a 75% chance that the business will succeed. Calculate the expected utility. Should you invest?

   EU = -$10,000 + ($12,000 x .75) + ($0 x .25) = -$10,000 + $9,000 + $0 = -$1000
   You should not invest in this business (since doing so would have a negative EU).

5. What is the expected utility of agreeing to flip a coin three times under the following circumstances? If it is Heads on the first try, you win $5; but you lose $2 if it is Tails. If it is Heads on the second try, you win $2; but you lose $10 if it is Tails. If it is Heads on the third try, you win $2; but you lose $2 if it is Tails. Finally, if it is Heads three times in a row, you win an extra $20.

   EU = [($5 x .5) + (-$2 x .5)] + [($2 x .5) + (-$10 x .5)] + [($2 x .5) + (-$2 x .5)] + ($20 x .125)
   = $2.5 - $1 + $1 - $5 + $1 - $1 + $2.5
   = $0