MAT330/681, Spring 2020 **Renato Ghini Bettiol**

Homework Set 6

DUE: MAR 30, 2020 (VIA BLACKBOARD BY 11:00AM)

To be handed in:

Please write your solution to Problem 1 on a single sheet of paper!

1. Suppose you use a fair coin flip, i.e., such that $P(H) = P(T) = \frac{1}{2}$, to play each of the following two games:

   - Game A: You win \$1.00 with H, and lose \$0.50 with T.
   - Game B: You win \$5.00 with H, and lose \$6.00 with T.

   Let A and B be random variables that represent your earnings when playing games A and B respectively. Compute the following quantities, simplifying your answers:

   a) $E(A)$
   b) $E(B)$
   c) $E(A+B)$
   d) $\mathrm{Var}(A)$
   e) $\mathrm{Var}(B)$
   f) $\mathrm{Cov}(A,B)$
   g) $\mathrm{Var}(A+B)$

   Interpretation questions:

   h) Which single game is *riskier*, A or B?
   i) Which single game is *most profitable* in the long run, A or B?
   j) What is the *most profitable strategy* (for example: only play A, only play B, play both A and B but A 2x more frequently than B, etc.), assuming you have infinite capital to play and can play A and/or B as much as you want?