Math 483 HW 13 2033. Due Monday, Oct. 16.
Exam 2, Th. Oct. 12. **One page, problems A)-C).**

A) 5.103 Assume Y_1 and Y_2 are random variables withe $E(Y_1) = 2$, $E(Y_2) = -1$, $E(Y_3) = 4$, $V(Y_1) = 4$, $V(Y_2) = 6$, $V(Y_3) = 8$, $Cov(Y_1, Y_2) = 1$, $Cov(Y_1, Y_3) = -1$ and $Cov(Y_2, Y_3) = 0$.

i) Find $E(3Y_1 + 4Y_2 - 6Y_3)$.

ii) Find $V(3Y_1 + 4Y_2 - 6Y_3)$.

Comment: Use theorem 5.12ab on p. 271. See ex. 5.25 and ex. 5.26.

B) 5.105 Let Y_1 and Y_2 have joint pdf

$$f(y_1, y_2) = \begin{cases} 4y_1y_2, & \text{if } 0 \le y_1 \le 1,\ 0 \le y_2 \le 1 \\ 0, & \text{otherwise.} \end{cases}$$

In HW11 C) it was shown that Y_1 and Y_2 are independent. Find $V(Y_1 - Y_2)$.

Comment: Find the marginal pdf $f_{Y_1}(y_1)$ of Y_1 and then find $V(Y_1)$ by finding $E(Y_1)$ and $E(Y_1^2)$. By symmetry, $V(Y_2) = V(Y_1)$. Since Y_1 and Y_2 are independent, $\text{Cov}(Y_1, Y_2) = 0$. Use these numbers in theorem 5.12b.

C) 6.1abce Let Y have pdf

$$f(y) = \begin{cases} 2(1-y), & \text{if } 0 \le y \le 1 \\ 0, & \text{otherwise.} \end{cases}$$

a) Find the pdf of $U_1 = 2Y - 1$.

b) Find the pdf of $U_2 = 1 - 2Y$.

c) Find the pdf of $U_3 = Y^2$.

e) Find $E(Y)$ and $E(Y^2)$ and then use these quantities to find

i) $E(U_1)$.

ii) $E(U_2)$, and

iii) $E(U_3)$.

Comment: DO NOT FORGET THE SUPPORT. Do NOT use method of transformations. a) See ex. 6.1 on p 298.
b) Be careful of the negative sign. See an example done in class.
c) See p. 304 - 307 and an example done in class.
e) See p. 170-171. Find $E(Y)$ and $E(Y^2)$.