**Show all work**. A correct answer with no solution will give only a partial credit.
  Write each problem on a separate page. Each answer should be clearly written in the end of the page. Preferably, make a single pdf file and submit in HuskyCT.

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(1) Find the moment generation function of $m_X(t) = \mathbb{E}e^{tX}$ for a random variable $X$ with the probability density $f(x) = (x - 1)/2$ when $1 < x < 3$ and zero otherwise. Also, find $m_X(0)$, $m'_X(0)$, $m''_X(0)$ by computing the moments of $X$.

(2) Look at problems $2(a, b, c)$ in Test 2 given last week: find the moment generating function $m_X(t) = \mathbb{E}e^{tX}$ and the joint moment generating function $m_{X,Y}(s, t) = \mathbb{E}e^{tX+sY}$.
    Hint: if you use the change of variables $u = x + y$, $v = x - y$, you can solve this problem using the table of distributions, without computing any integrals.

***Extra credit question***:    in the situation of problems $2(a, b, c)$ in Test 2 given last week, use moment generating functions to confirm that $\mathbb{E}X = 5/4$ and $\mathbb{E}XY = 5/3$, and to compute $\mathbb{E}X^2$ and $\mathbb{E}X^3$.
  Hint: it may be helpful to use Taylor expansions.

*End of the quiz*