Math.Econ.Anal.Test.2. 15.nov.28.

1. (2+3+2+3 points)
   Compute the following integrals:

   (a) $\int \sqrt[4]{3x^5} + \sqrt[2]{(5x)^6} + \frac{7}{3x} \, dx$

   (b) $\int x \cdot e^{5x} \, dx$

   (c) $\int_2^5 3 + 4x \, dx$

   Solve the following DE: $y'(x) = -10x + 3, \, y(1) = 2$.

2. (2+4+4 points)
   A) Solve the following DE: $y'(x) = -4y(x), \, y(0) = 3$.
   B) Solve the following DE: $y'(x) = -4y(x) + 8$.
   C) Let $f(x) = (x+2)^5 y^6$. Compute $f'_x, f'_y, f''_{xy}, f''_{yx}$!

3. (6+2+2 points)
   A) Find the critical point of $f(x,y) = x^2 - 2y^2 - 2xy + 6x + 7$ and determine the critical point's type!
   Ba) Roll a fair dice. Are the events $odd = $"$the\,outcome\,is\,odd$" and
   $large = $"$the\,outcome\,is\,larger\,then\,three$" are independent?
   Bb) Compute the conditional probability $p(odd\,|large)$!

4. (6+(2+2) points)
   A) There are two urns containing colored balls. The first urn contains 4 red balls and 6 blue balls. The second urn contains 3 red balls and 7 blue balls. One of the two urns is randomly chosen in such a way that the first urn is chosen with 0.7 probability. Then a ball is drawn at random from one of the two urns. If a red ball is drawn, what is the probability that it comes from the first urn?
   B) Toss afair coin two times, and let h denote the number of heads. Compute $E[h]$ and $Var[h]$!