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REP REP Second Midterm Test, 2016 12 14, 10pm, 50 minutes

1. The height of a randomly chosen man follows the normal distribution with an expected value of 180 cms and a standard deviation of 10 cms. The height of a randomly chosen woman follows the normal distribution with an expected value of 170 cms and a standard deviation of 5 cms. In a large group of people 25 % are men, 75 % are women.
 - (a) What is the probability that a randomly chosen person in that group is taller than 175 cms?
 - (b) What is the probability that a randomly chosen person is a woman on condition that the person is taller than 175 cms?

2. The weight and the height of a randomly chosen woman – as a two-dimensional random variable – follows a two-dimensional normal distribution. The correlation coefficient is 0.8. The standard deviation of the weight of women with a height of 175 centimeters is 4 kg.
 - (a) How much is the standard deviation of the weight of women?
 - (b) How much is the standard deviation of the weight of women who are 165 centimeters tall?

3. (X, Y) follows the distribution which has the density function $f(x, y) = \frac{4}{x^4}$ ($x > 1$; $0 < y < \frac{1}{x}$).
 - (a) Find the density function and expected value of X .
 - (b) Find the conditional density function of Y on condition that $X = x$.

4. Give the meaning of the the second moment of a continuous random variable
 - (a) by a correct(!) mathematical formula,
 - (b) in words, based on experimental results.

Standard normal distribution function
(with 2 decimals)

x	$\Phi(x)$	x	$\Phi(x)$	x	$\Phi(x)$
0.0	0.50	1.0	0.84	2.0	0.98
0.1	0.54	1.1	0.86	2.1	0.98
0.2	0.58	1.2	0.88	2.2	0.99
0.3	0.62	1.3	0.90	2.3	0.99
0.4	0.66	1.4	0.92	2.4	0.99
0.5	0.69	1.5	0.93	2.5	0.99
0.6	0.73	1.6	0.95	2.6	1.00
0.7	0.76	1.7	0.96		
0.8	0.79	1.8	0.96		
0.9	0.82	1.9	0.97		