Probability and Statistics 1. Exercises 11

1. Show that the gamma distribution $\Gamma(\nu/2, 1/2)$ is a chi-squared distribution with ν degrees of freedom. (Hint: First prove this for $\nu = 1$ and then use the convolution identity for the gamma distribution.)

2. A company manufactures an electronic device to be used in a very wide temperature range. The company knows that increased temperature shortens the life time of the device, and a study is therefore performed in which the life time is determined as a function of temperature. Fit the line of regression, for the following data:

Temperature in Celsius (t)	10	20	30	40	50	60
Life time in hours (y)	420	360	275	175	115	35

3. A genetics engineer was attempting to cross a tiger and a cheetah. She predicted a phenotypic outcome of the traits she was observing to be in the following ratio 4 stripes only: 3 spots only: 9 both stripes and spots. When the cross was performed and she counted the individuals she found 50 with stripes only, 41 with spots only and 85 with both. According to the Chi-square test at significance level of 5%, did she get the predicted outcome?