



## Wealth distributions - Problem Set 1

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### Exercise 1 - The exponential distribution

Recall the Exponential distribution:

- a) State the cumulative distribution function
- b) State the probability density function. What is the relationship between the cumulative distribution function and the probability density function.
- c) Suppose that the longevity of a light bulb is exponential with a mean lifetime of eight years. If a bulb has already lasted 10 years, find the probability that it will last a total of over 17 years.
- d) Show graphically how cdf and pdf look like.

### Exercise 2 - Understanding the GINI and the Lorenz curve

- a) Please explain the GINI and the Lorenz curve verbally. You may use bullet points.
- b) Sketch the Lorenz curve for two extreme cases and give a quick answer, too. Imagine:
  1. Imagine a country where everyone has the same level of wealth.
  2. Imagine a country in which a single person holds all the wealth.

### **Exercise 3 - Quartiles**

Determine the

- a) first, second and third quartile
- b) mean and median

of the following list of numbers.

1, 3, 5, 6, 7, 4, 6, 3, 8, 9, 10, 15, 16