| Graded homework **Functions** | 1ère DNL 2013-14 |

due Tuesday, November 19th 2013

Exercise 1. *Mutation in fruit flies*

In a study of mutation in fruit flies, researchers radiate flies with X-rays and determine that the mutation percentage increases linearly with the X-ray dosage D, measured in Kilo-Roentgens (kR). When a dose of D = 3kR is used, the percentage of mutations is 7.7%, while a dose of 5kR results in a 12.7% mutation percentage.

1) Express M as a function of D.

2) What percentage of the flies will mutate even if no radiation is used?

3) Predict the X-ray dosage which results in a 10% mutation percentage.

Exercise 2. *Immunization*

Suppose that during a nationwide program to immunize the population against a certain form of influenza, public health officials found that the cost of inoculating x% of the population was approximately $f(x) = \dfrac{150\,x}{200 - x}$ million dollars.

1) For what values of x does $f(x)$ have a practical interpretation in this context? From now on, we will assume that x is in this interval.

2) a) What was the cost on inoculating the first half of the population?

  b) What was the cost on inoculating the second half of the population?

  c) How can you explain the difference between these two costs? Can you think of any reason why the two costs would be different?

3) What percentage of the population had been inoculated by the time 37.5 million dollars had been spent?

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