1. In “Tobacco and Alcohol Use in G-Rated Children’s Animated Films,” by Goldstein, Sobel and Newman (Journal of the American Medical Association, Vol. 281, No 12), the lengths (in seconds) of scenes showing tobacco use were recorded for animated movies from Universal Studios. Six of those times are listed below.

\[0, 223, 0, 176, 0, 548\]

a) (8 points) Determine the mean of the sample.

b) (8 points) Determine the mode of the sample.

c) (11 points) Determine the first quartile of the sample \((Q_1)\).

d) (8 points) Determine the second quartile of the sample \((Q_2\) or median).

e) (11 points) Determine the third quartile of the sample \((Q_3)\).

f) (12 points) Please indicate whether the following statements are true (T) or false (F).

( ) If the largest measure is 1700 instead of 548 the mean increases.
( ) If the largest measure is 1700 instead of 548 the mode increases.
( ) If the largest measure is 1700 instead of 548 the median increases.
( ) The interquartile range is 111.5.
( ) The range is 548.
2. Three studies were conducted to investigate the effectiveness of x-rays to detect tuberculosis. In the first study, 1000 people who were known to suffer from tuberculosis were given x-rays, and 901 of them presented positive results. In the second study, 1000 healthy people were given x-rays, and 27 of them showed positive results. Finally, in a third study, a blind survey was passed to all individuals applying to obtain or renew a driving license, and the percentage of individuals answering negatively was 0.999907. Assuming that this sample is representative of the US population and that people answered truthfully, answer the following questions.

a) (7 points) What is the false positive rate for x-rays?

b) (7 points) What is the false negative rate for x-rays?

c) (7 points) Provide an estimate of the incidence of tuberculosis in the US population.

d) (21 points) If an x-ray is given to a randomly selected person and it is positive, what is the probability that the person suffers from tuberculosis? In light of this result, what would be your recommendation for the use of x-rays to diagnose tuberculosis?