

# Homework 13

(due April 6)

Math 130 *Kovitz* 2020

1. The number of bacteria in a culture is increasing according to the law of exponential growth.

After 7 hours there are 4.096 grams of bacteria, and after 10 hours there are 8 grams of bacteria.

- (a) How many bacteria will there be after 13 hours?
  - (b) About how long does it take for this population to double (in fractions of an hour)?
  - (c) After how many hours are there 16 grams of bacteria (in fractions of an hour)?
  - (d) After how many hours are there 16.384 grams of bacteria?
  - (e) After how many hours are there 100 grams of bacteria?
2. A population of fruit flies is increasing according to the law of exponential growth. At time 1 hour there is 1 pound of flies and at time 4 hours there are 4 pounds of flies.
    - (a) Find the exact value of the doubling time. (No calculator is necessary.)
    - (b) True or false: at time 2 hours there were exactly 2 pounds of fruit flies.
    - (c) If false, about how many pounds of fruit flies were there at time 2 hours (to the nearest four-decimal accuracy or as an exact radical expression).
    - (d) True or false: at time  $2\frac{1}{2}$  hours there were exactly 2 pounds of fruit flies.
    - (e) Find the one-hour growth factor. That is the ratio of the number of fruit flies at any given time to the number of fruit flies one hour earlier. For this experiment, it's a constant. State its approximate decimal or exact radical value.