

Question 1

Solve $\log_7(4x - 5) + \log_7(20x - 11) = 3$

Question 2

Solve $\log_2(3x + 17) - \log_2(8x - 36) = \log_2(24) - \log_2(3)$

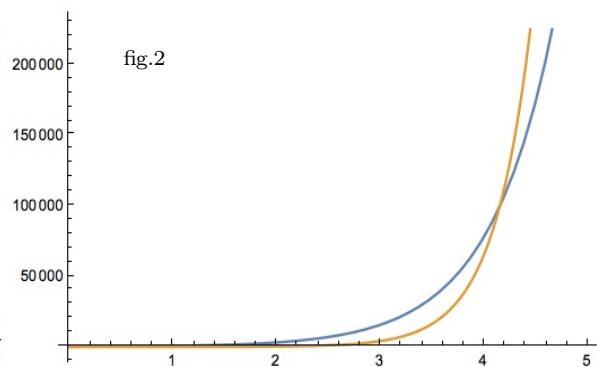
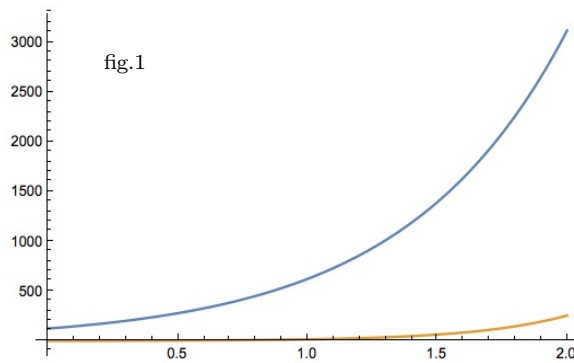
Question 3

Two populations of bacteria (\mathcal{B}_1 and \mathcal{B}_2) are growing (as shown in fig.3) at different rates.

Their populations at time t are given by $n_1(t) = 5^{(t+3)}$ and $n_2(t) = 4^{(2t)}$ respectively (t in days).

The first picture shows the population for t between 0 and 2.6 (i.e. during two days 14h 24 min)

The second picture shows the population for t between 0 and 5 (i.e. the first five days)



- i) What population has the greatest pop in figure one ?
- ii) At what time are the populations the same ?

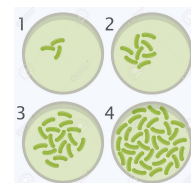


fig.3

Question 4

Suppose we have 17 grams of Polonium-210.

As it is an unstable isotope Polonium, half of Polonium-210 disintegrate in 138 days.

- i) How long it would take for having only $\frac{1}{8}$ of the initial mass of Polonium-210 ?
- ii) How long time it would take to have only 1 g of Polonium-210 ?
- iii) How long time it would take for 99% of this Polonium-210 to disintegrate ?