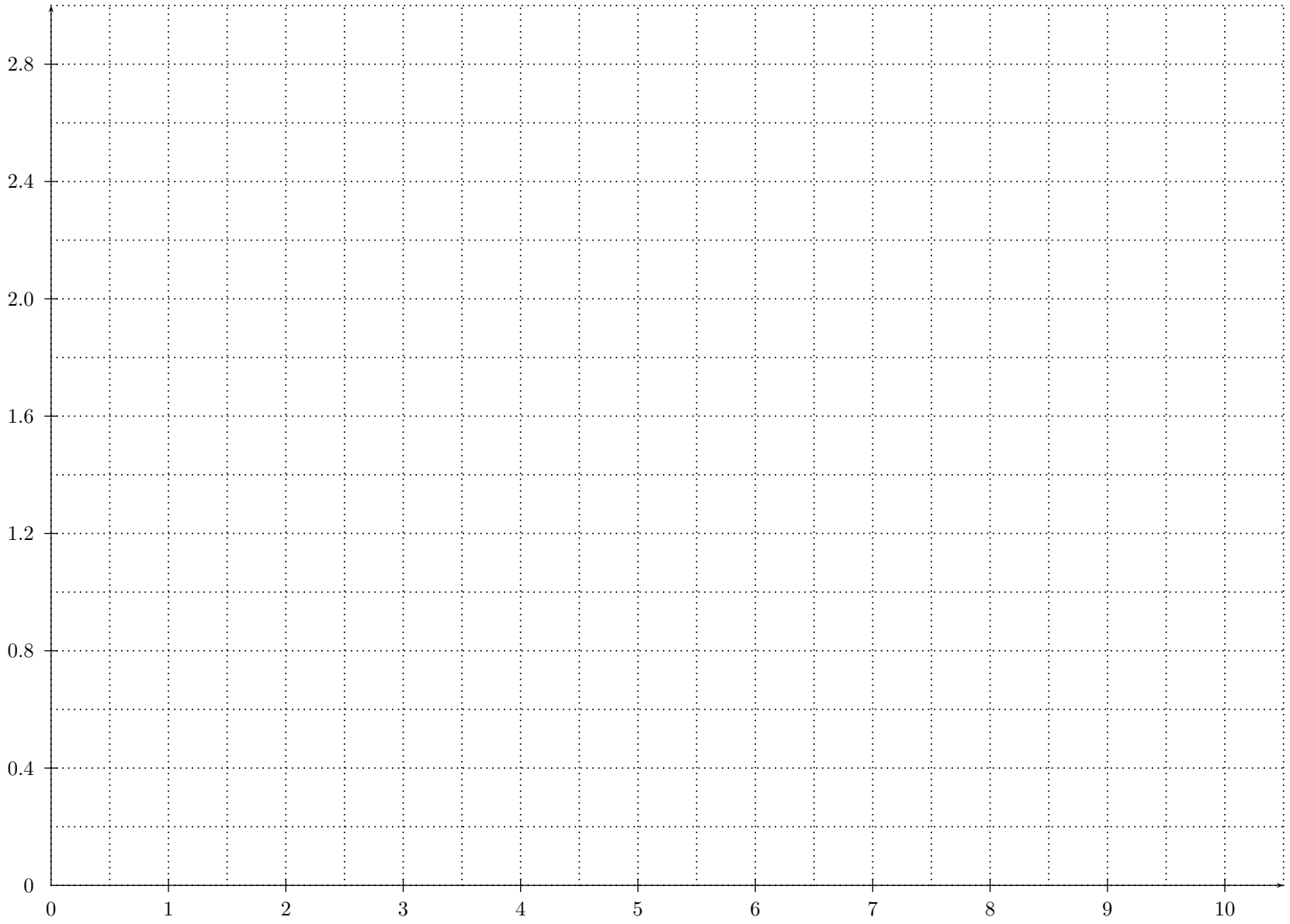
A drug is injected intra-muscularly. It's assimilited by the blood through the muscles and then dispelled by the kidneys.
Let $f(t)$ be the drug quantity (measured in milliliters) in the blood at the time t (measured in hours).
A medical study establishes :

$$f(t) = q(e^{-0.5t} - e^{-t})$$

where q is the initial quantity of the injected drug.

1. (a) Find the derivative of f.
   (b) Determine where f creases and where f decreases.
   (c) Find the absolute maximum value of f.
   (d) Evaluate $\lim\limits_{t \to +\infty} f(t)$.
2. Supervision of the drug's effects.
   The drug quantity in the blood must not exceed
   the toxicity threshold $th_M = 2.6$ mL.
   The drug is only efficient if the quantity is greater than or equal to
   $th_m = 1.2$ mL.
   (a) Use the result from question 1(c) to determine which values of q could be injected without exceeding the toxicity threshold.
   (b) For the following questions $q = 10$.
   Find the equation of Δ the tangent line to the curve $\mathscr{C}_f$ at $(0, 0)$ then sketch $\mathscr{C}_f$ and Δ.
   (c) Use the curve $\mathscr{C}_f$ to determine at which interval of time the drug is efficient.


2.8
2.4
2.0
1.6
1.2
0.8
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1
2
3
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