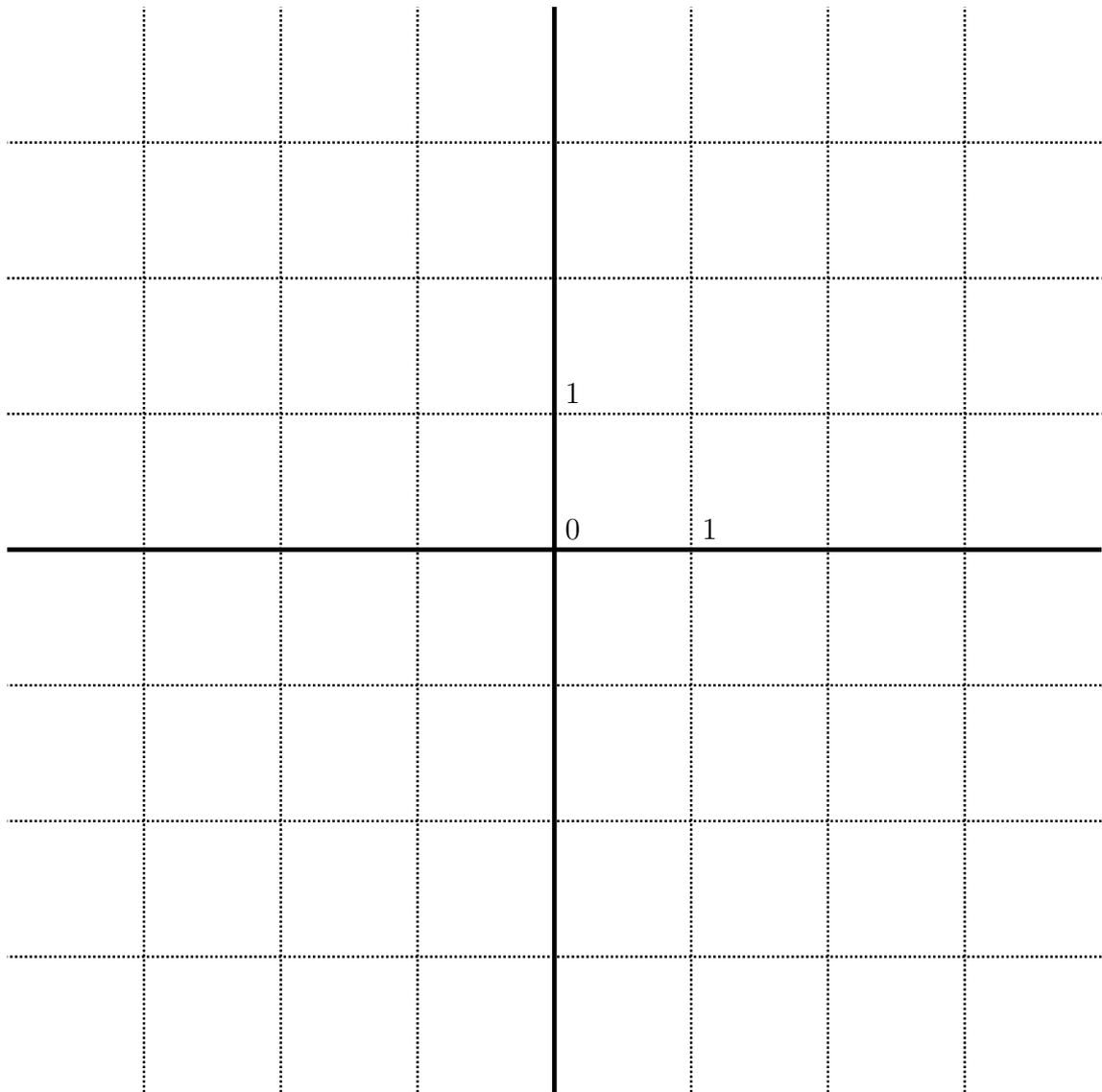


3. Perform the long division of $(x - 3)(x + 1)(x - 1)$ by $(x - 2)^2$ (*hint*: expand before).

4. Give all horizontal and slant asymptotes of f . For each of them, tell if the graph of f is below or above the asymptote when x becomes very positive and when x becomes very negative (justify).

5. Draw the graph of f and its asymptotes.



Problem 2: (3) Simplify as much as possible the following expressions:

1. $\exp(\ln 22 - 3 \ln 2) =$

NB: $\exp(x) = e^x$.

2. $3 \log(4000) - 2 \log(8) =$

Problem 3: (3) Solve the equation $\ln(3x + 7)^2 = 4$.

Problem 4: (6) Solve the following system of equations:

$$\begin{cases} x - y + 2z = 6 \\ -x + y + 3z = 4 \\ 3x - y + 2z = 12 \end{cases}$$

Problem 5: (6) Solve the equation $x^3 + 3x^2 - 27x + 7 = 0$ (start by looking for rational solutions).

Problem 6: (5) Mr. Tanaka has a bank account with 2% interest per year, compounded monthly. The first of January 2019, he needs 1.000.000 yens. How much money at least does he need to have the first of August 2017 on his account? (He will not take or add any money from or on his account in between)? Note: you can give a formula.

Problem 7: (4) The bank of M. Sato, Mrs. Takahashi and Mrs. Watanabe proposes two types of savings accounts: a low-risk one, and a high-risk, very speculative one. All of them put 1 Million yens of savings on their savings accounts the first of January 2015. M. Sato put half of his savings on his low-risk account and the other half on his high-risk account. Mrs. Takahashi decided to put one third of her savings on her low-risk account and two thirds on the high-risk account. Finally, Mrs. Watanabe put two thirds on her low-risk account and one third on her high-risk account.

The first of January 2017, Mrs. Takahashi had 1.1 Millions yens on her accounts while Mrs. Watanabe has only 1.07 Millions yens. How much did M. Sato have on his accounts at that date?