1) Prove that for every positive rational number \( r \) satisfying the condition \( r^2 < 2 \) one can always find a larger rational number \( (r + h) \) where \( 0 < h < 1 \) for which \((r + h)^2 < 2\).

2) Solve the following inequalities:
   a) \( 1 - \frac{2x}{x^2 - 1} < \frac{x - 3}{x - 1} \).
   b) \( |x - 3| + |x + 2| < 11 \).

3) a) Sketch the graph of \( y = f(x) = (x - 1)^{2/3} + 2 \) by using the graph of \( y = f(x) = x^{2/3} \) and shifting methods.
   b) Sketch the graph of \( y = f(x) = 1 - \sin 2x \) by using the graph of \( y = f(x) = \sin x \) and shifting methods.

4) Find a function of the form \( f(x) = ax^2 + bx + c \) if it is known that \( f(0) = 5, f(-1) = 10 \) and \( f(1) = 6 \).

5) Find the domain of the following functions:
   a) \( f(x) = \sqrt{x^2 - 3x + 2} + \frac{1}{\sqrt{3 + 2x - x^2}} \).
   b) \( f(x) = \frac{1}{\sqrt{\sin x}} + \sqrt[3]{\sin x} \).