BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MTH 30 (Nikos Apostolakis) **Midterm Exam**
Fall 2025 1 hour, 25 minutes

Name: _____

Instructions:

This quiz contains 7 pages (including this cover page) and 6 problems. Check to see if any pages are missing. Please print your name clearly on the top of this page, and put your initials on the top of every page, in case the pages become separated.

You are allowed to use a calculator.

You are required to show your work on each problem on this quiz. The following rules apply:

- Make sure to indicate your final answer clearly.
- **Mysterious or unsupported answers will not receive full credit**. A correct answer, unsupported by calculations, explanation, or other work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.
- If you need more space, use the back of the pages; clearly indicate when you have done this.

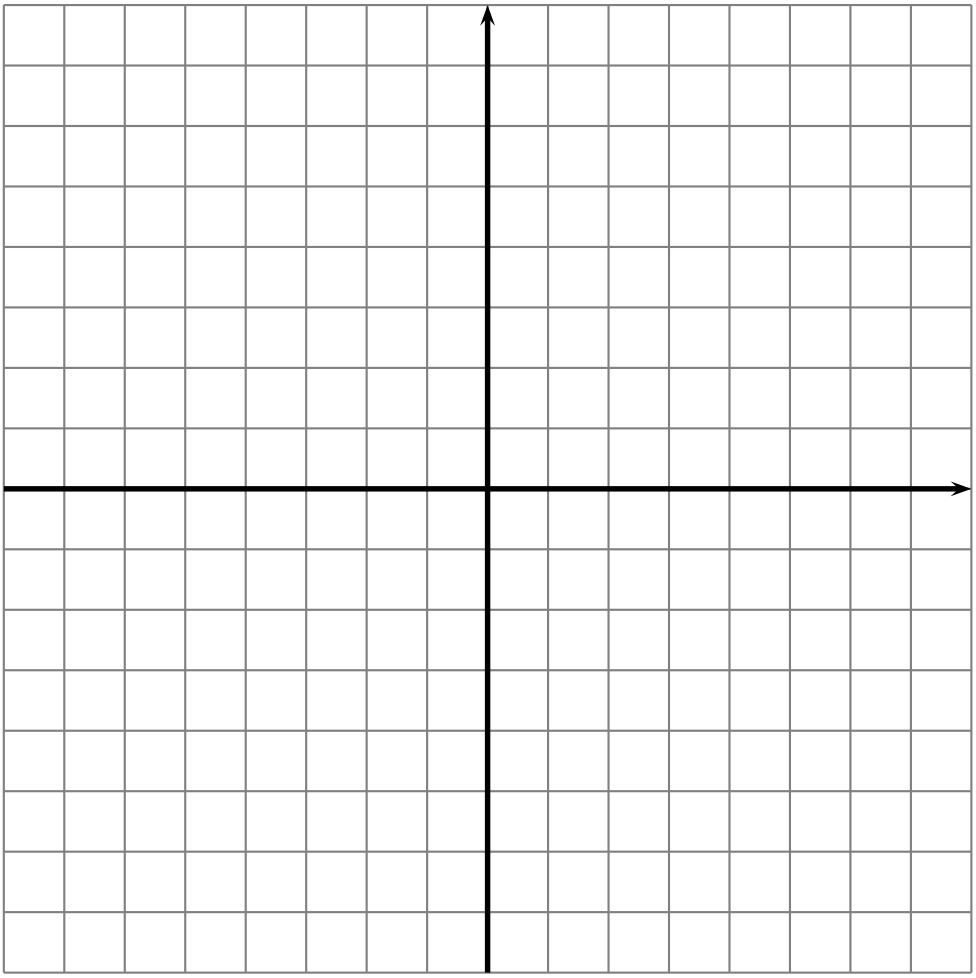
1. Let $f(x) = \dfrac{2x}{3x-1}$.

   (a) What is the domain of f?

   (b) Show that f is invertible by finding f^{-1}.

   (c) What is the range of f?

2. Graph the function with formula $f(x) = 2x^2 + 3x - 2$ in the grid below. Make sure to indicate the intercepts and the vertex.



3. Find the domain of each of the following functions:

(a) $f(x) = \dfrac{3x-2}{x^2-4}$.

(b) $f(x) = \dfrac{3x-2}{x^2+4}$.

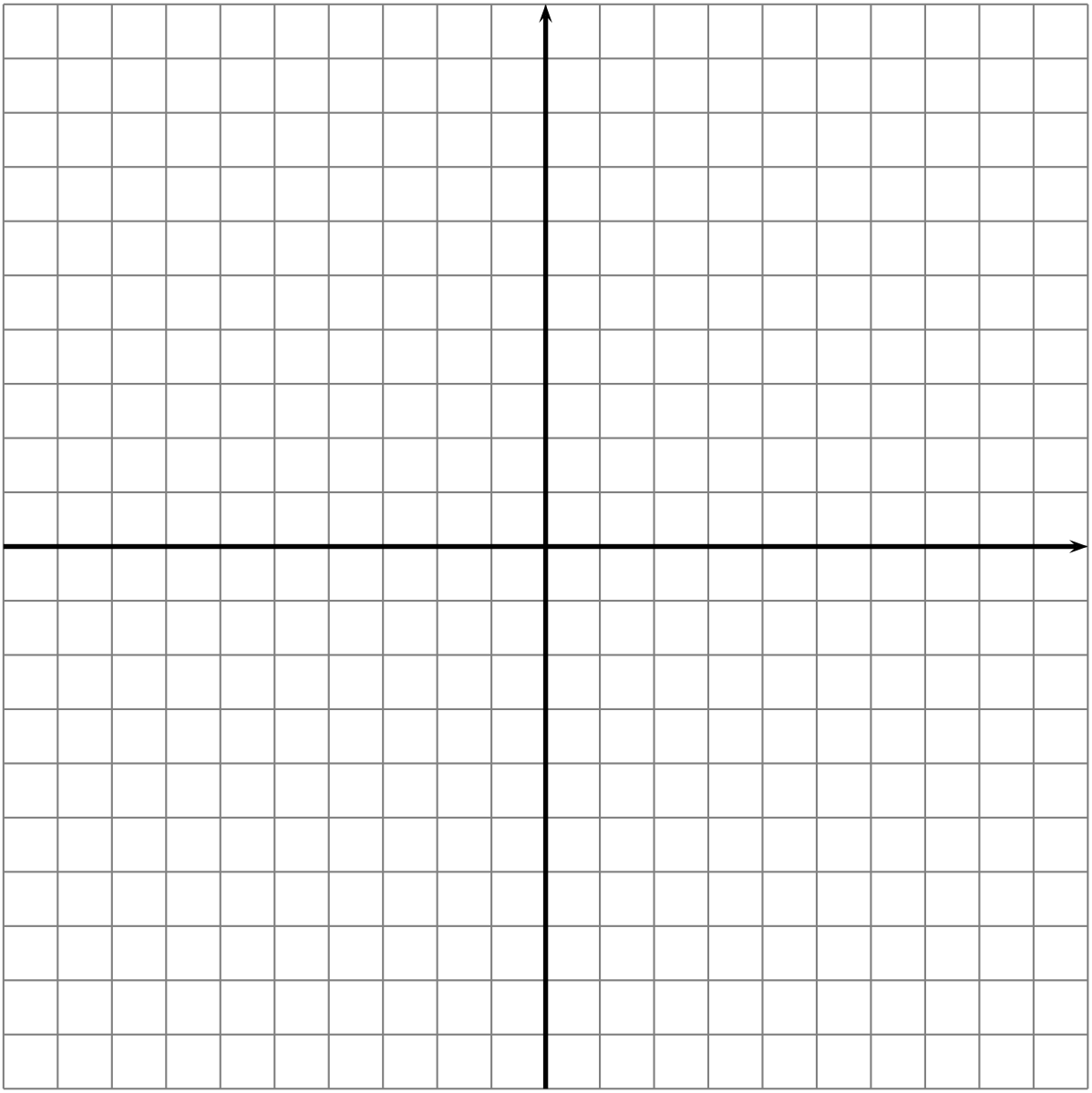
(c) $f(x) = \sqrt{2x-3}$.

4. Solve $x^3 + x^2 - 4x - 4 = 0$.

5. Sketch a rough graph for the function with formula

$$f(x) = (x-2)(x+1)^2(2x-3)$$

in the grid below.



6. Use the graph of the previous question to solve

$$(x-2)(x+1)^2(2x-3) > 0.$$