

Question:	1	2	Total
Points:	10	10	20
Score:			

In order to receive full credit, you must **show all your work** and simplify your answers. Submit your written solutions by the end of class on Blackboard (look for the “Exam #2 In-Class” Assignment). Please **scan your written answers to a single pdf file**.

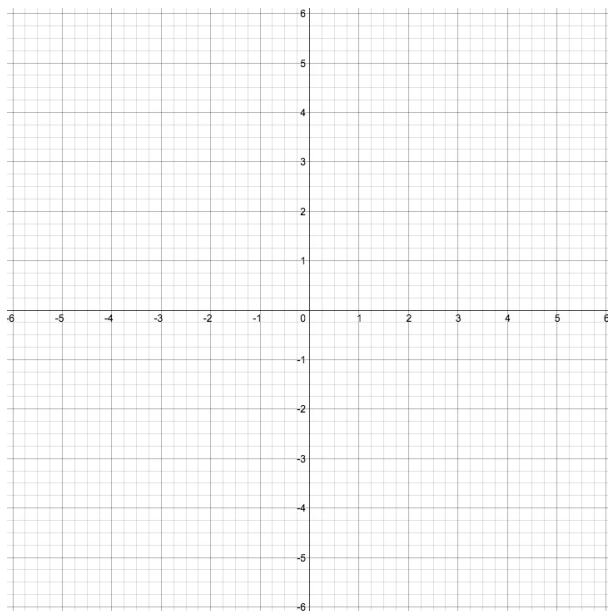
1. (10 points) Consider the quadratic polynomial

$$q(x) = x^2 - 3x - 4$$

- (a) Find the roots of $q(x)$ algebraically. (Hint: Either factor $q(x)$ or use the quadratic formula.)

- (b) What is the y -intercept of $q(x)$? (Hint: evaluate $q(0)$.)

- (c) Sketch a rough graph of $q(x)$, labelling the x -intercepts and the y -intercept with their coordinates:

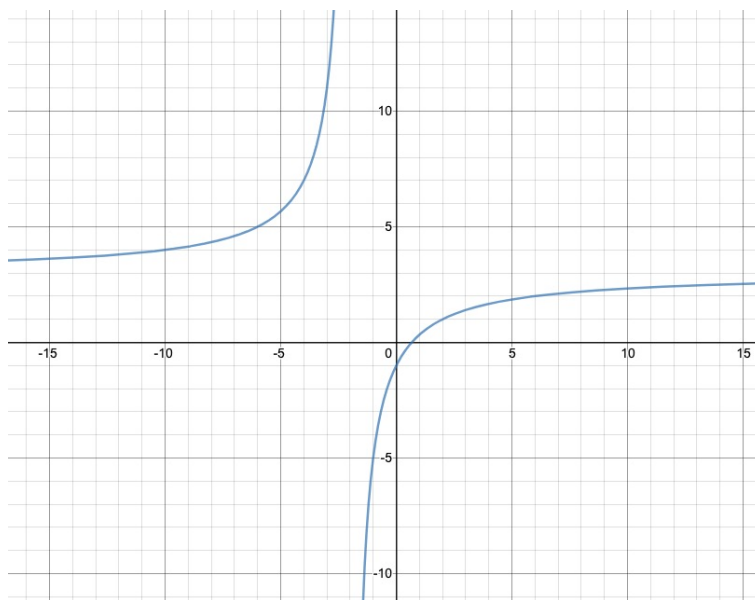


- (d) Use your graph to solve the following inequality: **circle the parts of your graph corresponding to the solution of the inequality** and then write down the solution set in interval notation:

$$x^2 - 3x - 4 \geq 0$$

2. (10 points) Consider the rational function: $f(x) = \frac{3x - 2}{x + 2}$

- (a) What is the domain of f ? Show your calculations, and write the solution in interval notation.
- (b) What is the equation of the vertical asymptote of this function?
- (c) What is the equation of the horizontal asymptote of this function? Show your calculation.
- (d) Algebraically calculate the x -intercept(s) and y -intercept of the graph of $f(x)$. Again, show the necessary calculations, and write the coordinates of the intercepts in (x, y) form:
- (e) On the given graph of the function:
- Label the x - and y -intercepts with their coordinates
 - Draw the vertical and horizontal asymptotes as dashed lines, and label each with its equation



- (f) Use the graph (and the value of the root and the vertical asymptote) to solve the following inequality: **again, circle the parts of the graph corresponding to the solution set of the inequality**, and write down the solution set in interval notation.

$$\frac{3x - 2}{x + 2} \geq 0$$