

Exam 3A Part 1

MATH 1110, FALL 2017

NAME:

Complete this section without your calculator.

1. (10 points) Define $f(x) = x^4 - 5x^3 + 8x^2 - 20x + 16$. One zero of this function is $x = 2i$. Find all remaining zeros, both real and complex.

2. (10 points) Evaluate the following logs.

(a) $\log_4 16$

(b) $\log_2 \frac{1}{8}$

(c) $\log_n n^{4.2}$

Exam 3A Part 2

MATH 1110, FALL 2017

NAME:

Use your calculator.

3. (5 points) What is the domain of the rational function $g(x) = \frac{5}{x-3}$?

4. (22 points) Consider the rational function.

$$R(x) = \frac{x+1}{(x-1)(x+3)}$$

(a) Analyze the ratio of leading terms to find the end behavior. If the function has a horizontal asymptote or a slant asymptote, give its equation.

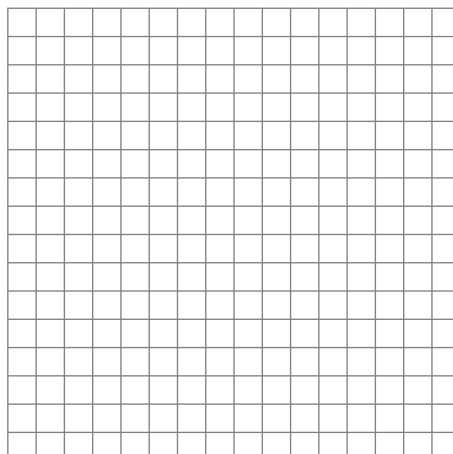
(b) Find the x -intercepts of the graph, if any.

(c) Find the equations for the vertical asymptotes, if any.

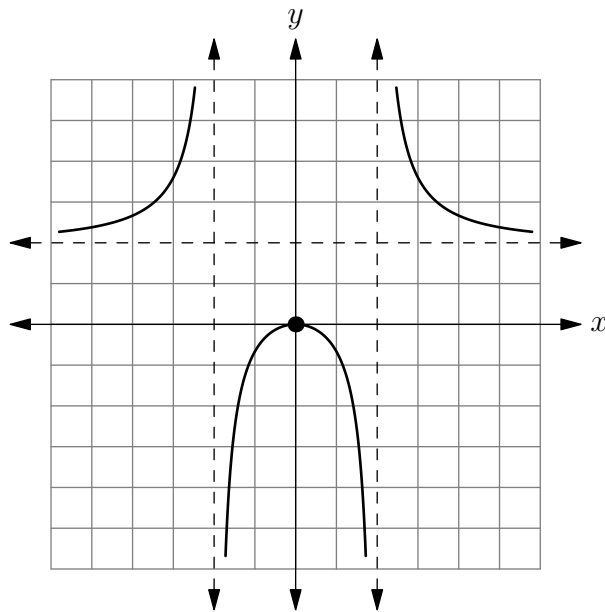
(d) Give the x -coordinates for the holes, if any.

(e) Based on your previous work, make a table of x - and y -coordinates for an appropriate choice of test values.

(f) Graph the function.



5. (10 points) Write an equation for the rational function shown in the graph. The asymptotes are shown as dashed lines.



6. (5 points) Define $f(x) = 3x - 5$ and $g(x) = x^2$. Simplify $(g \circ f)(x)$.

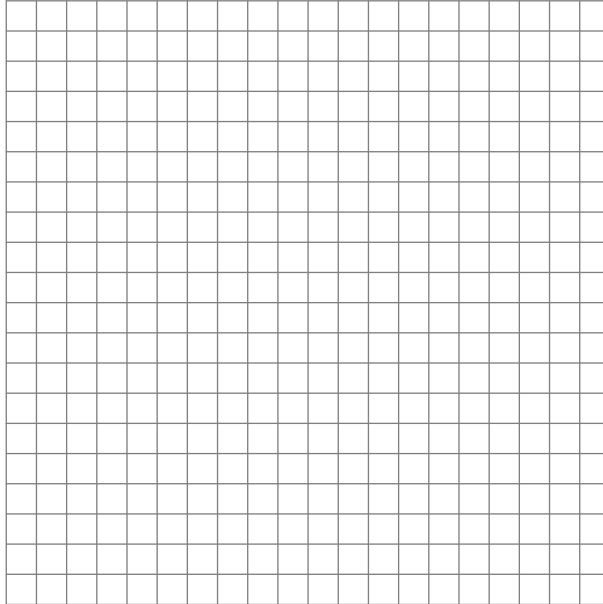
7. (11 points) Give the formula for the inverse function. You may assume that the function is one-to-one without testing.

$$g(x) = \frac{1}{x-1}$$

8. (8 points) Sketch a picture of the function

$$y = 2 \cdot 3^{x-1}$$

by using transformations. Show the correct shape and at least three correct coordinates.



9. (4 points) Write the expression as a single log.

$$\log_2 u + \log_2 v - \log_2 w$$

10. (16 points) Solve each equation.

(a) $e^x = 100$

(b) $11 \cdot 3^{x+1} = 88$

(c) $\log_2 x = 10$

(d) $\ln(3x + 7) + 18 = 40$

11. (5 points extra credit) Solve the equation $\log_{15} x + \log_{15}(x - 2) = 1$.