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MATH 114
Second Midterm Exam
Prof. Jesenko Vukadinović

Name: _____

TA: _____

P1	
P2	
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P7	
P8	
TOTAL	

Read each question carefully and try to understand it before answering the questions. You may use the back of the pages if you need extra space. **Show all the computations to get full credit. Write clearly. Good luck!!**

1. (10pts) Show that 1 is a zero of multiplicity 2 of the polynomial

$$f(x) = x^4 - 7x^3 + 17x^2 - 17x + 6,$$

express $f(x)$ as a product of linear factors, and then sketch the graph of f .

2. (10pts) Find the domain, the asymptotes and the x and y intercepts of

$$g(x) = \frac{x^2 + x - 6}{x - 1},$$

and then sketch the graph.

3. (10pts) Let

$$f(x) = \frac{x-1}{x-2}.$$

Find the domain D_f and the range R_f of f , and show that f is one-to-one. Find the inverse, and check your answer.

4. (15pts) The marketing research for a cable company concluded the following: if the company charges \$40 a month, then 10,000 households will sign up for the service. Each \$10 increase will result in 1,000 cancellations. Find the revenue as a function of the price (it is the number of households signed up times the price), and then determine what price will result in the maximum revenue for the company.

5. (10pts) Perform the long division to find the quotient and remainder if $f(x) = x^4 + 2x - 1$ is divided by $p(x) = x^2 + 1$.

8. (10pts) Solve the equation

$$2^x = 7 + 2^{3-x}.$$

It is not enough to guess the answer!!! You have to show how you get the solutions.