

MATH 114  
10. 27. 2006

Name:

**TEST 2**

Please circle the name of your TA:

Boonkasame (Tete)

Ali Godjali

Mathew Joseph

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Show all your work in order to receive credit. A correct answer without any work will receive 0 credit. Please write your answers neatly. You are NOT allowed to use calculators. Good luck!

P1	
P2	
P3	
P4	
P5	
TOTAL	

1. (16 pts) Find a polynomial  $f(x)$  of degree 4 with real coefficients and leading coefficient 1 knowing that  $-1$  is a root of  $f(x)$  with multiplicity 2 and  $1 - i$  is also a root. Write your polynomial in the standard form.

$$f(x) = \underline{\hspace{10cm}}$$

2. (16 pts) Let  $f(x) = \frac{x^3 - 1}{x^2 - 1}$ . Determine the following (if none write "none").

Domain of  $f(x)$

vertical asymptotes

horizontal asymptotes

$x$ -intercept

$y$ -intercept

3. (16 pts) Solve the logarithmic equation

$$\log_2(x - 1) + \log_2(3x + 2) = 1 + \log_2 x$$

$x =$  \_\_\_\_\_

4. A radioactive element decays according to the formula

$$Q(t) = 810(3)^{-\frac{t}{5}}$$

where  $t$  is in days and  $Q$  represents the amount of this element measured in grams.

- a. (6 pts) How many grams are there initially?

- b. (10 pts) After how many days will there be only 10 grams remaining?

$t =$  \_\_\_\_\_

5. The speed  $V$  at which an automobile was travelling before the brakes were applied is directly proportional to the square root of  $L$ , the length of the skid marks.

a. (6 pts) Express  $V$  as a function of  $L$  by means of a formula that involves a constant of proportionality  $k$ .

b. (10 pts) For a certain automobile on a dry surface  $L = 36$  ft when  $V = 60$  mi/h. Find the value of  $k$

$k =$  \_\_\_\_\_