

Math 114 (Algebra & Trigonometry)
Lec. 2, Fall Sem. 2001-02

NAME:

Prof. R.A. Brualdi

TA:

Exam 2: Nov. 2, 2001

SECTION:

Be Sure to Show your WORK

Graphing & Programmable Calculators Not Allowed or Needed

Problem	Points Received
1.(20 points)	
2.(20 points)	
3.(20 points)	
4.(20 points)	
5.(20 points)	
TOTAL (100 points)	

1. (a) Determine the remainder when $x^{100} + 2x^5 + 3$ is divided by $x + 1$:

ANSWER (CIRCLE):

(b) Determine **exactly** all roots (real and complex) of $x^3 - 3x^2 + 3x - 2$.

ANSWER (CIRCLE):

(c) Determine the real and imaginary parts of the complex number $z = \frac{3+4i}{1+2i}$, that is, find real numbers a and b so that $z = a + bi$.

ANSWER (CIRCLE):

2. (a) Determine the equations of any asymptotes (horizontal, vertical, slant - indicate which) of:

(i) $y = \frac{2x-1}{x^2+3x-4}$

ANSWER (CIRCLE):

(ii) $y = \frac{2x^2-1}{x+3}$

ANSWER (CIRCLE):

(b) Sketch the qualitative nature of the graph of (i) above, labelling all intercepts and asymptotes:

3. (a) Determine exactly:

(i) $e^{\ln 3.24}$.

ANSWER (CIRCLE):

(ii) $\log_3 \sqrt{3}$:

ANSWER (CIRCLE):

(iii) $\ln e$:

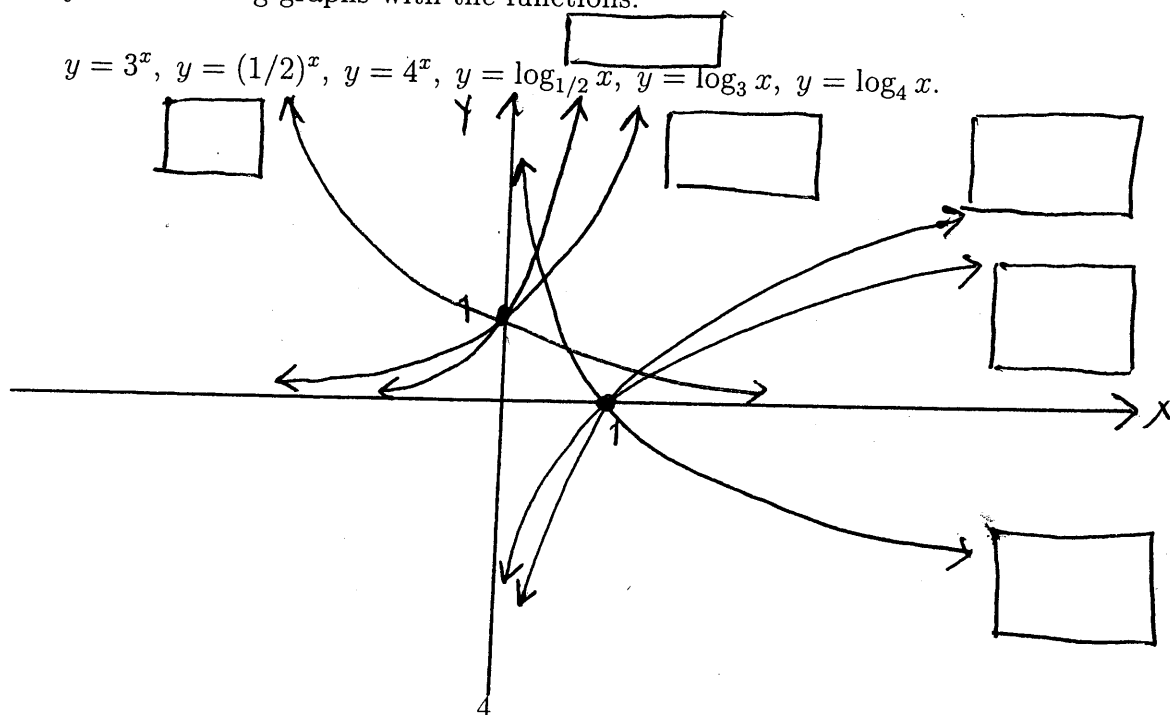
ANSWER (CIRCLE):

(iv) $\log_6 2 + \log_6 3$:

(v) $\log_{1/2} 12 - \log_{1/2} 3$:

ANSWER (CIRCLE):

(b) Identify the following graphs with the functions:



4. \$5,000 is deposited with a financial institution that boasts an annual interest rate of 6%, continuously compounded. For each of (a) and (b) below, **first give an exact answer** and then use your calculator to get an approximate answer.

(a) How long does it take for the balance in the account to grow to \$10,000 ?

ANSWER (CIRCLE):

(b) What initial deposit would have resulted in the value of the account being \$10,000 in 5 years?

ANSWER (CIRCLE):

5. First some facts you *may* need to use:

$$\sin \pi/6 = \cos \pi/3 = 1/2; \sin \pi/3 = \cos \pi/3 = \sqrt{3}/2; \sin \pi/4 = \cos \pi/4 = \sqrt{2}/2.$$

(a) Compute **exactly** (if undefined say so):

(i) $\tan(4\pi/3)$:

ANSWER (CIRCLE):

(ii) $\sin(-7\pi/6)$:

ANSWER (CIRCLE):

(iii) $\sec \pi/2$:

ANSWER (CIRCLE):

(iv) $\cos t$ where $\sin t = -0.4$ and $3\pi/2 < t < 2\pi$:

ANSWER (CIRCLE):

(b) What is the **equation of the function** $y = f(t)$ which is obtained from the function $y = \cos t$ by a stretch of the amplitude by a factor of 4, a vertical shift of 2 units upward, a phase shift of π units, and a stretching of the period to 3π ?

ANSWER (CIRCLE):