

**MATH 16B:**  
**FAKE TEST 3B**

SPRING 2007

(1) Integrate the following:

$$\int \frac{x(x+3)(x-2)}{(x-3)(x+2)} dx.$$

(2) Determine whether the following integrals converge or diverge. If they converge, find their value.

a)  $\int_5^{\infty} \frac{1}{(x-3)^2} dx,$

and

b)  $\int_0^5 \frac{1}{(x-3)^2} dx.$

(3) Consider two random variables  $x$  and  $y$  with frequencies given by

$x$	$n(x)$	$y$	$n(y)$
1	5	1	1
2	4	2	4
3	3	3	5
4	2	4	5
5	1	5	4
6	5	6	1

- Sketch the frequency distributions for both random variables.
- For each random variable, make a chart which lists the associated probabilities.
- Find the expected value and variance for each random variable.

(4) Consider the function

$$f(x) = e^{-x/5}.$$

- On what interval is  $f$  a probability density function, i.e., find  $b$  for which  $f$  is a probability density on  $[0, b]$ ?
- For this value of  $b$ , find the mean and median of the continuous random variable  $x$  whose density is  $f$ .
- For this value of  $b$ , find the variance and standard deviation of  $x$ .

- (5) Supposed  $x$  is a continuous random variable with uniform distribution on the interval  $[a, b]$ . Calculate the mean, median, and variance for  $x$ .