

Student name: _____

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MATH 10A (Butler)
Midterm I, 29 January 2007

This test is closed book and closed notes, with the exception that you are allowed one $8\frac{1}{2}'' \times 11''$ page of handwritten notes. No calculator is allowed for this test. When answering the questions you are only allowed to use tools and techniques that we have discussed up to this point, i.e., no techniques involving differentiation may be used. For full credit show all of your work (legibly!), unless otherwise specified.

1. (8 points) Find the exact value(s) of p such that:

$$\ln(p^2 - 1) - \ln(p - 1) = 5$$

1	
2	
3	
4	
5	
Σ	

2. Let $h(t) = 3 + e^{t+2}$.

(a) (4 points) What is the domain and range of h ?

(b) (4 points) Find a formula for $h^{-1}(t)$.

(c) (2 points) What is the domain and range of h^{-1} ?

3. (MULTIPLE CHOICE QUESTIONS, 3 points each). Write your answer in the space provided. There is no partial credit for incorrect answers.

_____ If $g(t) = 2^t$ then the graph of $g(t + 1)$ is

- (a) a horizontal shift to the LEFT by 1 of the graph of $g(t)$.
- (b) a horizontal shift to the RIGHT by 1 of the graph of $g(t)$.
- (c) a vertical stretch by a factor of 2 of the graph of $g(t)$.
- (d) two of the above.
- (e) none of the above.

_____ If $r(s) = \sin(s^2 + 1)$, then $r(s)$

- (a) is EVEN.
- (b) is ODD.
- (c) is both EVEN and ODD.
- (d) is neither EVEN nor ODD.
- (e) is completely unknowable. (Hint: this is not the right answer.)

_____ If $f(-1)=g(1)=0$, $f(0)=g(2)=-1$, $f(2)=g(-1)=1$ and $f(1)=g(0)=2$, then $g(f(1)) =$

- (a) -1 .
- (b) 0 .
- (c) 1 .
- (d) 2 .
- (e) cannot be determined from the information given.

4. (8 points) Find the value of k so that the function $m(t)$ is continuous at $t = 2$, where

$$m(t) = \begin{cases} kt - 3 & \text{if } t \leq 2; \\ 5t + 4k & \text{if } t > 2. \end{cases}$$

5. Consider the following function, $q(x) = \frac{3x^2 - 9x + 6}{6 - 4x - 2x^2}$.

(a) (6 points) Determine if q has a horizontal asymptote as $x \rightarrow \infty$. In other words, evaluate the following limit:

$$\lim_{x \rightarrow \infty} \frac{3x^2 - 9x + 6}{6 - 4x - 2x^2} =$$

(b) (6 points) When $x = -3$ or 1 the function q is undefined (since we have division by 0). It is simple to check that at $x = -3$ there is a vertical asymptote. Determine what should happen at $x = 1$. In other words, evaluate the following limit:

$$\lim_{x \rightarrow 1} \frac{3x^2 - 9x + 6}{6 - 4x - 2x^2} =$$