

Math 124
Exam 2
May 23rd, 2008

Name: _____

1. Your exam contains 5 questions and 5 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values vary and these are indicated on each problem. You have 50 minutes for this exam.
3. Make sure to **ALWAYS SHOW YOUR WORK**; you will not receive any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. If you need extra space, use the back of the exam and clearly indicate this.
5. You are allowed one 8.5×11 sheet of handwritten notes (both sides). Graphing and scientific calculators are not permitted.
6. Leave answers in exact form (as simplified as possible).
7. Put a

box around your final answer

 where applicable.

Problem	Total Points	Score
1	39	
2	10	
3	16	
4	16	
5	19	
Total	100	

1. (39 pts.) Differentiate the following. Do not simplify your answers.

(a) (10 pts.) $\frac{d}{dt}[\sec(\pi t) \cdot (e^t + 5)] = ?$

(b) (10 pts.) Find $f'(x)$ if $f(x) = \sqrt{\ln(3x^2 - 7)}$.

(c) (9 pts.) $\frac{d}{dx}\left[\frac{x^3-1}{\arcsin(2x)}\right] = ?$

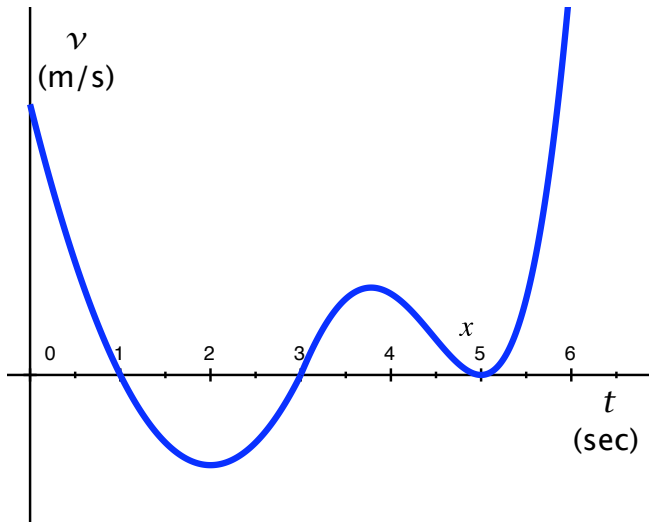
(d) (10 pts.) Find $\frac{dy}{dt}$ if $y = (\sin t)^t$.

2. (10 pts.) Find the 23rd derivative of $g(x) = e^{-2x} + \ln 3$.

-
3. (16 pts.) A 10 foot ladder leans against a vertical wall. Let θ be the angle between the bottom of the ladder and the ground.

Find the **rate at which the angle θ is changing** if the bottom of the ladder slides away from the wall at a rate of 5 ft/sec when the bottom of the ladder is 5 feet way from the wall. **Include units** in your answer.

4. (16 pts.) The following is a graph of the **velocity function** of a robot squirrel moving along a straight path for 6 seconds.



- (a) (4 pts.) When is the squirrel at rest?

- (b) (4 pts.) Find all the times for which the squirrel moving forward.

- (c) (4 pts.) Approximate the time intervals for which the **acceleration** of the squirrel is positive.

- (d) (4 pts.) When is the squirrel speeding up?

5. (19 pts.)

(a) (4 pts.) Verify that the point $(2, 0)$ is on the curve $e^y + x^2y = \frac{1}{2}x + y^3$.

(b) (15 pts.) Find the **equation** of the tangent line to the curve $e^y + x^2y = \frac{1}{2}x + y^3$ at $(2, 0)$.