

## MATH 1325-104 MIDTERM II

INSTRUCTOR: DAVID MILOVICH

Name: \_\_\_\_\_

- One sheet of notes (double-sided) is allowed.
- A calculator is recommended.
- Show your work.

Exercise	Point Possible	Score
1	27	
2	19	
3	27	
4	27	
Total	100	

1. **[27 points]** Find the line tangent to the curve  $y^2x + x^2 + y = 7$  at the point  $(2, 1)$ .

2. [19 points] Compute the derivative of  $\ln(e^{\sqrt{x}} + 1)$ . Show your steps, not just the final answer.

**3. [27 points]** The South American population, in millions, is currently 393 and growing at a relative rate of 1.13% per year. The North American population, in millions, is currently 538 and growing at a relative rate of 1.03% per year. What is the current (absolute) rate of change of the North American fraction of the total population of the Americas?

4. [27 points] A rancher wants to build a rectangular fence on a hillside with a north side, east side, south side, and west side. He has a budget of \$25,000. Because the hillside slopes down to the north, the north and south sides of the fence will cost \$12 per foot, but the east and west sides will cost \$17 per foot. What is the maximum area the farmer can enclose?