

# Quiz16, MAT 1375 Professor Chiu

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

- This quiz consists of 2 sets of questions for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Scientific calculators are allowed.
- Wishing you success.

True or False questions:

1. T The product rule for logarithms states that  $\log_b(MN) = \log_b M + \log_b N$ .
2. T  $-10$  is a solution of  $\log_5(x + 35) = 2$ .
3. F  $-3$  is a solution of  $\log_5 9 = 2\log_5 x$ .
4. T Since the exponential function  $b^x$  is one to one, then  $b^x = b^y \Leftrightarrow x = y$ .
5. T The value that  $(1 + \frac{1}{n})^n$  approaches as  $n$  gets larger and larger is the natural base  $e$ .

Show all your work and justify your answer:

6. Solve the exponential equation  $7^{2x+1} = 3^{x+2}$ .

① Take "ln" on both sides:  $\ln(7^{2x+1}) = \ln(3^{x+2})$

power rule  
↓  
 $(2x+1) \cdot \ln(7) = (x+2) \ln(3)$

$\Rightarrow 2x \ln(7) + \ln(7) = x \ln(3) + 2 \ln(3) \Rightarrow$

$\Rightarrow 2x \ln(7) - x \ln(3) = 2 \ln(3) - \ln(7)$

$\Rightarrow x \cdot (2 \ln(7) - \ln(3)) = 2 \ln(3) - \ln(7)$

$\Rightarrow x = \frac{2 \ln(3) - \ln(7)}{2 \ln(7) - \ln(3)}$