

**FINAL EXAMINATION
MATHEMATICS 914
APPLIED MATHEMATICS – BUSINESS ADMINISTRATION**

December 12, 2005

2:00-5:00 P.M.

STUDENT NAME: _____

EXAMINERS: M. PERL, S. KENGATHARAM

INSTRUCTIONS

- Non-programmable calculators are permitted.
- A formula sheet is provided.
- **SHOW ALL WORK.** No marks will be given for trial and error or guess and check.

Question #	Out of	Mark
1	8	
2	16	
3	4	
4	8	
5	4	
6	8	
7	8	
8	8	
9	4	
10	4	
11	4	
12	4	
13	4	
14	4	
15	6	
16	6	

1. Simplify:

i) $\frac{3x}{x^2 - 4} - \frac{1}{x^2 + 4x + 4}$

ii) $\left(\frac{2x^4 y^{10}}{3^{-1} x^{-2} y^5}\right)^{-2}$

2. Solve the following equations.

i) $\frac{3x+1}{2} + \frac{5x-3}{6} = \frac{20x+3}{9}$

ii) $\begin{cases} 2x+3y = 9 \\ 5x-2y = -25 \end{cases}$

iii) $3^x = 1000$ (Answer to 3 decimal places.)

iv) $3x^2 - 7x = -2$

3. If $f(x) = 3x^2 - 2x - 5$, find the difference quotient $\frac{f(x+h) - f(x)}{h}$.

4. If $f(x) = 2x^2 - x - 1$ and $g(x) = 2x + 1$

i) Find $\frac{f(x)}{g(x)}$
[i.e. Divide $2x^2 - x - 1$ by $2x + 1$]

ii) Find $(f \circ g)(1)$.

5. Consider the function $y = 2^{x+1}$. Complete the following table and sketch the graph clearly labeling the points in the table.

$x =$	-2	-1	0	1	2	3
$y =$						

6. i) Rewrite as the sum and/or difference of simple logarithms.

$$\log_3 \left(\frac{x^2 \sqrt{y}}{z^3} \right)$$

- ii) Graph $y = \log_4 x$. (Use table of values.)

7. Write the equation of the line passing through the point $(-2, -7)$ that is perpendicular to the line given by the equation $3x + 5y = 11$.
8. The demand function for an item is given by $p = 300 - 0.1x$ where x represents the number of units.
- i) Find the revenue function, $R(x)$.
- ii) At what price will the revenue function be maximized.
9. A company's supply function is given by $p = q^2 + q + 40$. The company's corresponding demand function is given by $p = -3q + 100$. Find the equilibrium price and quantity.
10. You invest \$5000 at simple interest for 10 years. If your investment is worth \$9000 find the rate of interest.
11. If you deposit \$3000 in a bank that pays interest at 7% compounded monthly. Find the accumulated value after 8 years.
12. How long will it take for \$12000 invested at 6.5% compounded continuously to accumulate to \$20000.
13. A company offered an annuity that pays 6.65% compounded quarterly if \$2500 is deposited into this annuity at the end of every 3 months. How much is in the account after 10 years?
14. An inheritance of \$450,000 will provide how much at the end of each year, for the next 20 years, if money is worth 7% compounded annually?
15. A company orders \$305,000 worth of merchandise and receives a series discount of 30/15/10.
Find: i) the net price.
ii) the total discount.
16. An item sells for \$104. There is a markup rate of 30% based on selling price.
Find: i) the cost price.
ii) the mark up.