Math 0120-10124 Business Calculus　　　　Instructor: Dr. Predrag Punoševac

Final Exam

Student Name:_____

Student ID#:_____

Each problem is worth 10 points. Give a <u>complete</u> solution to receive the full credit!

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1. Rewrite each of the following as an expression of x which does not involve any logs.

   (a) $\log\left(100^x\right)$

   (b) $10^{-\log(x)}$

2. If $\log_a b = 8$, $a > 0$, $a \neq 1$, $b > 0$, find the value of $\log_a\left(\frac{a^{17}}{b}\right)$.

3. Find the intervals in which the function $g(x) = \frac{1}{2}x^2 - \ln(x)$ is decreasing.

4. Use the second-derivative test to find and classify all relative extreme points of the function.

$$f(x) = -x^3 + 3x^2 - 4$$

5. Evaluate indefinite integral.

$$\int \left(\frac{1}{\sqrt[3]{x}} + 3e^{-\frac{1}{3}x} - \frac{\sqrt{2}}{x} \right) dx$$

6. Find the average rate of change of the function $f(x) = \log(x)$ on the interval $[1, 10]$.

7. Use substitution method to find the following integral

$$\int \frac{t^1}{\sqrt[2]{t^2 + 4}}\, dt$$

8. A company that produces tracking devices for computer disk drives finds that if it produces x devices per week, its cost will be $C(x) = 180x + 16000$ and its revenue will be $R(x) = -2x^2 + 660x$

   (a) Find the company's break-even points;

   (b) Find the maximum profit.

9. Find the average value of the function $f(x) = \ln(x)$ on the interval $[1, 3]$.

10. Among the following graphs of two different function identify the one:

A   B
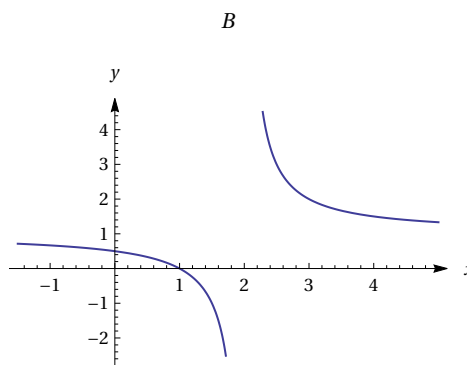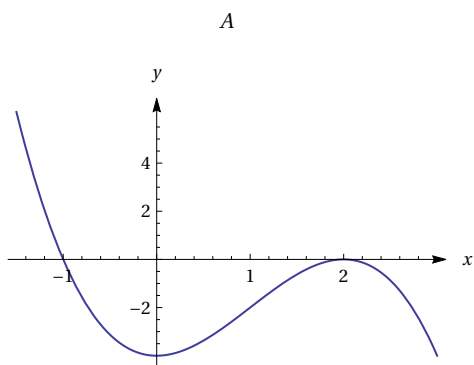
(a) representing a function which has an inflection point at $x = 1$;

(b) representing a function which has a zero at $x = 1$;

(c) representing a function which has a local min at $x = 0$;

(d) representing a function which is increasing on the interval $[0, 2]$.