

Prince Sultan University

Department of Mathematical Sciences

Fall Term, 2015 (Term 151) December 26, 2015

MATH 113 – Calculus II Final Exam

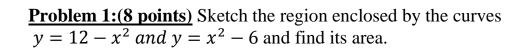
Time Allowed : 120 minutes Maximum Points: 80 points

Name of the stu	dent:			
ID number	:			

Important Instructions:

- 1. You may use a scientific calculator that does not have programming or graphing capabilities.
- 2. You may NOT borrow a calculator from anyone.
- 3. You may NOT use notes or any textbook.
- 4. There should be NO talking during the examination.
- 5. Your exam will be taken immediately if your mobile phone is seen or heard
- 6. Looking around or making an attempt to cheat will result in your exam being cancelled
- 7. This examination <u>has 6 problems</u>, some with several parts and a <u>total of 6 pages</u>. Make sure your paper has all these problems.

80	40



<u>Problem 2:(8 points)</u> Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the curves $y = x^3$, y = 8, x = 0 about the x-axis.

Problem 3:(12 points; 4 points each) Evaluate the following integrals. a) $\int xe^{x^2} dx$

a)
$$\int xe^{x^2} dx$$

b)
$$\int_0^{\frac{1}{2}} x \cos(\pi x) \ dx$$

c)
$$\int 2x(x+3)^6 dx$$

Problem 4:(12 points; 6 points each)

a) Write down the partial fraction decomposition of the function

$$f(x) = \frac{4}{(x^2 - 4)(x + 1)}$$

b) Evaluate the integral $\int f(x)dx$, where f(x) is the function in part (a).

Problem 5:(24 points; 6 points)

Determine whether the following series converges or diverges.

a)
$$\sum_{n=1}^{\infty} \frac{\ln(n)}{n^2}$$

b)
$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{3n+5}$$

$$\mathrm{c}) \sum_{n=1}^{\infty} \frac{(-2)^n}{n^3}$$

$$\mathrm{d}) \sum_{n=1}^{\infty} \frac{\sin(2\mathrm{n})}{2^n}$$

Problem 6:(16 points; 8 points each)
Determine for which x, the following series converges.
a) $\sum_{n=1}^{\infty} \frac{x^n}{3n-4}$

$$a) \sum_{n=1}^{\infty} \frac{x^n}{3n-4}$$

$$b)\sum_{n=1}^{\infty} \frac{(4x-7)^n}{n^4}$$