Answer Key 1

MATH 10560: Calculus II **Practice Exam 3.2** *November 23, 2009*

Record your answers to the multiple choice problems by placing an $\times$ through one letter for each problem on this page. There are 12 multiple choice questions worth 7 points each. You start with 16 points.

You may not use a calculator.

1.	•	b	c	d	e	7.	a	•	c	d	e
2.	a	b	•	d	e	8.	a	b	c	•	e
3.	a	•	c	d	e	9.	a	b	c	d	•
4.	a	b	c	d	•	10.	a	b	c	•	e
5.	a	b	c	•	e	11.	a	•	c	d	e
6.	•	b	c	d	e	12.	a	b	•	d	e

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4.	a	b	c	d	e	10.	a	b	c	d	e
5.	a	b	c	d	e	11.	a	b	c	d	e
6.	a	b	c	d	e	12.	a	b	c	d	e

1. Evaluate the indefinite integral $\int (1+x^3)^{-2}\,dx$ using power series. [*Hint:* Find a power series for $(1+u)^{-2}$ and substitute $u = x^3$.]

(a) $C + x - \frac{2}{4}x^4 + \frac{3}{7}x^7 - \frac{4}{10}x^{10} + \cdots$

(b) $C + x - x^2 + x^3 - x^4 + \cdots$

(c) $C + \frac{1}{4}x^4 - \frac{1}{7}x^7 + \frac{1}{10}x^{10} - \cdots$

(d) $C - 2x^3 + 3x^6 - 4x^9 + \cdots$

(e) $C - x + \frac{1}{2}x^2 - \frac{1}{3}x^3 + \frac{1}{4}x^4 - \cdots$

2. Determine which statement best applies to the series $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2n^2-1}{3n^2+1}$.

(a) *Converges by the Comparison Test*

(b) *Converges by the Alternating Series Test*

(c) *Diverges by the Divergence Test*

(d) *Diverges by the Ratio Test*

(e) *Converges by the Integral Test*

3. Determine which series *converge.*

(I) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n[\ln(n)]^2}$ (II) $\displaystyle\sum_{n=1}^{\infty} \frac{\sin(n)}{n\sqrt{n}}$ (III) $\displaystyle\sum_{n=0}^{\infty} \sqrt{\frac{2n+1}{n^3+1}}$

(a) (I), (II) and (III)

(b) (I) and (II)

(c) (II) and (III)

(d) (I) and (III)

(e) (II)

4. Find the Taylor series for $f(x) = x^4 + x^2 + 1$ centered at $a = 1$.

(a) $3 + 6(x-1) + 14(x-1)^2 + 24(x-1)^3 + (x-1)^4$

(b) $1 + (x-1)^2 + (x-1)^4$

(c) $1 + 5(x-1) + 6(x-1)^2 + 4(x-1)^3 + (x-1)^4$

(d) $3 + 7(x-1) + 9(x-1)^2 + 5(x-1)^3 + (x-1)^4$

(e) $3 + 6(x-1) + 7(x-1)^2 + 4(x-1)^3 + (x-1)^4$

5. Find the sum $\dfrac{2+3}{4} + \dfrac{2^2+3^2}{4^2} + \dfrac{2^3+3^3}{4^3} + \cdots$.

(a) 3 (b) 1 (c) 5 (d) 4 (e) 2

6. Determine which phrase applies to the series $\displaystyle\sum_{n=2}^{\infty} \frac{\cos(n\pi)}{n+1}$

(a) *converges conditionally*

(b) *is not alternating*

(c) *has an infinite radius of convergence*

(d) *converges absolutely*

(e) *diverges*

7. Use *Taylor's Inequality* to estimate the maximum error of approximating $f(x) = xe^x$ by $T_2(x) = x + x^2$ on the interval $-1 \leq x \leq 1$.

(a) $3/e$ (b) $2e/3$ (c) $4e$ (d) $e/3$ (e) $4/e$

8. Calculate the sum $\displaystyle\sum_{n=1}^{\infty} \Big(\tan^{-1}(n) - \tan^{-1}(n+1)\Big)$ by finding the limit of the m-th partial sum.

(a) 2 (b) *diverges* (c) 1 (d) $-\pi/4$ (e) $\pi/2$

9. Determine which of the following approximates $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^3}$ using the least number of terms and having an error less than 0.05.

(a) 1 (b) $1 - \frac{1}{8} + \frac{1}{27}$ (c) $1 - \frac{1}{8} + \frac{1}{27} - \frac{1}{64}$

(d) $1 - \frac{1}{8} + \frac{1}{27} - \frac{1}{64} + \frac{1}{125}$ (e) $1 - \frac{1}{8}$

10. Use power series to calculate $\lim_{x \to 0} \frac{x^4 - x\sin(x^3)}{\exp(x^{10}) - 1}$

(a) 1/3 (b) 2/5 (c) 1/2 (d) 1/6 (e) 0

11. Determine the interval of convergence for the power series $\sum_{n=1}^{\infty} \frac{(x+1)^n}{n\,4^n}$.

(a) $-3 \le x \le 5$ (b) $-5 \le x < 3$ (c) $-5 < x < 3$ (d) $-3 \le x < 5$ (e) $-5 < x \le 3$

12. Determine which phrase applies to the series $\sum_{n=1}^{\infty} \left(1 - \sqrt[n]{2}\right)^n$.

(a) *has an infinite radius of convergence* (b) *diverges*

(c) *converges absolutely* (d) *is not alternating*

(e) *converges conditionally*