Math 1420 - Calculus II

Final Exam Review Worksheet

Spring 2013, Dr. Graham-Squire

Work out each problem. When you finish, find the answer listed on the back page and its corresponding letter. Fill in that letter for each space where you find the question number. Question number 0 is done as an example.

0. Find the derivative. $f(x) = 2.7x$ Answer: $f'(x) =$ 2.7

1. Evaluate $\int_0^{\pi} t\cos(5t)dt$.

Answer: _____

2. Evaluate $\int_1^9 \frac{\sqrt{\sqrt{x}+1}}{\sqrt{x}}dx$.

Answer: _____

3. Evaluate $\int_0^3 \frac{x^3}{\sqrt{x^2+9}}dx$.

Answer: _____

4. Evaluate $\int_0^{\infty} xe^{-5x}dx$.

Answer: _____

5. Find the area bounded by the curves $f(x) = (x-1)^3$ and $g(x) = x - 1$.

Answer: _____$units^2$

6. Find the volume when the region bounded by $y = \sqrt{x}$, $y = 0$, and $x = 4$ is revolved around the line $x = 6$.

Answer: _____$units^3$

7. Find the volume when the region bounded by $y = 2x - x^2$ and $y = 0$ is revolved around the x-axis.

Answer: _____$units^3$

8. Find the volume of the solid whose base is bounded by $x^2 + y^2 = 4$ and whose cross-sections perpendicular to the x-axis are squares.

Answer: = _____$units^3$

9. Find the arc length of the graph of $y = \frac{1}{6}x^3 + \frac{1}{2x}$ on $[\frac{1}{2}, 2]$.

Answer: _____*units*

10. A 100-lb chain is 50 feet long and hangs vertically from the top of a 200-ft tall building with a 150-lb weight on the end. How much work is required to raise the weight to a height of 170 ft above the ground?

Answer: _____$ft - lb$

11. A swimming pool filled with water is in the shape of an inverted right circular cone. It has diameter of 16 feet and height of 5 feet. How much work is needed to pump out water over the side of the pool until only a 1 foot depth of water is left? Note: Water weighs 62.5 lbs/ft^3.

Answer: _____

12. Solve the initial-value problem $e^{-y}y' + \cos x = 0$ when $y(\frac{-\pi}{6}) = 0$. What is the absolute value of the constant of integration C?

Answer: $|C| =$ _____

13. Convert the point $(1, \sqrt{3}, 2\sqrt{3})$ from rectangular to spherical coordinates. The answer is the value you get fro ϕ.

Answer: $k =$ _____

14. If you wanted to find an approximation for the sum of the series $\sum_{n=0}^{\infty} \frac{(-1)^n n^3}{7^n}$, to what value of n would you need to add to get within an error of 0.0001?

Answer: $n =$ _____

15. Find the limit of the sequence $a_n = \dfrac{2^{n+1} + \cos^2 n}{2^n}$

Answer: _____

16. Determine if the series $\sum_{n=1}^{\infty} \frac{1-3^n}{5^n}$ converges or diverges. If the series diverges let your answer be 100. If it converges, let your answer be the sum of the series.

Answer: _____

17. Determine if the series $\sum_{n=1}^{\infty} \frac{n^2-3}{n^3+1}$ converges or diverges. If the series diverges let your answer be 200. If it converges, let your answer be 300.

Answer: _____

18. Determine if the series $\sum_{n=4}^{\infty} \left(\frac{1}{n} - \frac{1}{n+3}\right)$ converges or diverges. If the series diverges let your answer be 400. If it converges, let your answer be the sum of the series.

Answer: _____

19. Determine if the series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1} \ln n}{n}$ is absolutely convergent (answer = 500), conditionally convergent (answer = 600), or divergent (answer = 700).

Answer: _____

20. Determine if the series $\sum_{n=2}^{\infty} \frac{\sqrt{n^2-2}}{n(3^n)}$ is convergent (answer = 800) or divergent (answer = 900).

Answer: _____

21. Find the interval of convergence of the power series $\sum_{n=1}^{\infty} \frac{(x-4)^n}{n(5^n)}$. One endpoint is included in the interval and the other is not. The answer is the endpoint which <u>is</u> included.

Answer: _____

22. Find the radius of convergence of the power series $\sum_{n=0}^{\infty} \frac{n!(x+2)^n}{5^n}$

Answer: $R =$ _____

23. Starting with the series representation for $\frac{1}{1-x}$, find the power series representation for $\ln(1-x)$. Use this to find the sum of the series $\sum_{n=0}^{\infty} \left(\frac{1}{3}\right)^{n+1}) \cdot \frac{1}{n+1}$.

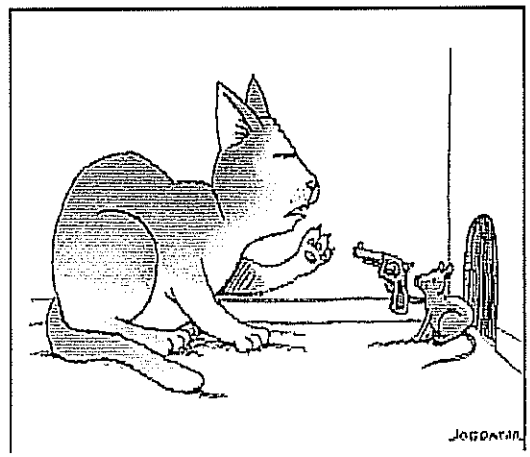
Answer: _____

24. Use Maclaurin series to evaluate $\lim_{x\to 0} \dfrac{x^3}{1+x+\frac{x^2}{2}-e^x}$

Answer: _____

25. Express $x^2 \cos 2x$ as a power series centered at zero. What is the coefficient of the x^8 term?

Answer: _____



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Answer	Letter	Answer	Letter
2.7	S	100	A
11	B	-5/4	Y
-6	A	43	C
128/3	S	1/25	O
-2/25	I	300	A
$\pi/6$	V	600	D
4600	I	800	T
500	P	700	T
-7	S	2	S
0	E	7	E
$192\pi/5$	N	-4/45	T
200	O	5	N
900	T	33/16	N
-1	H	$(4/3)(8-\sqrt{8})$	X
1/2	U	37/60	U
$24320\pi/3$	E	$18-9\sqrt{2}$	R
400	R	$16\pi/15$	D
3/2	L	$\ln(3/2)$	M

S

$\overline{0}$ $\overline{1}$ $\overline{2}$ $\overline{3}$ $\overline{4}$ $\overline{5}$ $\overline{6}$ $\overline{7}$ $\overline{8}$

$\overline{9}$ $\overline{10}$ $\overline{6}$ $\overline{11}$ $\overline{12}$ $\overline{1}$ $\overline{13}$ $\overline{14}$ $\overline{8}$

$\overline{15}$ $\overline{4}$ $\overline{5}$ $\overline{7}$ $\overline{4}$ $\overline{17}$ $\overline{18}$ $\overline{11}$ $\overline{19}$ $\overline{16}$ $\overline{17}$ $\overline{18}$