CAL 2 TEST 1 Show ALL Work NAME _____

Number _____

1. Simplify

A. $\ln(2e^5)$

B. $e^{x+\ln x}$

C. $\tan\left(\arcsin\frac{\sqrt{3}}{2}\right)$

2. Find y' when $y = \log_2 4x + \arcsin 3x + 4^{-x^2}\ln 4 + e^{\pi}$

3. Solve for y and simplify $\ln(y-2) = \ln(\sin x) - x$

4. A. $\lim_{x\to\infty} \frac{3^{\sin x}-1}{x} =$

B. $\lim_{x\to\infty} \frac{\ln(\ln x)}{\ln x} =$

5. A. $\int \frac{dx}{1+4x^2} =$

B. $\int \frac{x\,dx}{1+4x^2} =$

6. Find and simplify an equation of the tangent line to $f(x) = x\ln x$ at $x = e^{-2}$.

7. Simplify $\frac{d}{dx}\left[x^{\arcsin x}\right]$

8. Simplify $\int_{\ln 2}^{\ln 5} e^{3x}\,dx$

9. Simplify $\int_{1}^{2} 5^{(2x-2)}\,dx$

10. A new radioactive element XYZium is studied by placing 256 ~~gallon~~ ~~garm~~ grams on a plate on day zero. Only 32 grams remain 60 days later. Find Both the half-life and how many grams of XYZium will remain on day 100.

Calculus 2 Test 2 Show ALL work name _____ number ____

1. Write the general form [but do NOT evaluate the coefficients] for the partial fraction expansion of $\dfrac{(x-1)(x^2+3x+200)}{(x+3)(x-2)^2(x^2+5)}$

2 A. $\int \cos^3 x\,dx$

B $\int_{\pi/4}^{\pi/2} 4\sin^2 x\,dx$

3 Evaluate and simplify $\int_1^2 \dfrac{4\,dx}{x^2+2x}$

4. Does the integral $\int_1^\infty \dfrac{\sqrt{x+1}}{x^2}\,dx$ converge or diverge? WHY?

5. $\int x \ln 3x\,dx$

6. $\int \dfrac{dx}{x^2+4x+20}$

7&8 graph the conic & any asymptotes. Label the center and vertices

7. $x^2 - 4x - 4y^2 = 0$

8. $25x^2 + y^2 + 10y = 0$

9. The curve $f(x) = \frac{1}{x^2}$ from 2 to ∞ is rotated about the x-axis. Find the volume of this solid of revolution.

10. Rotate the coordinate axes to eliminate the cross-product term of $2x^2 + 2xy + 2y^2 = 3$. sketch the graph.

Cal 2 Test 3 3Apr92 by _____

show ALL work number _____

1. Use the integral test to check the convergence of $\sum_{n=1}^{\infty} e^{-n}$. By any means find the sum of this series.

In 2-5 determine if the series converges or diverges. JUSTIFY your answers!

2. $\sum_{n=1}^{\infty} \frac{2^n}{n^{100}}$

3. $\sum_{n=1}^{\infty} \frac{\ln n}{n^3}$

4. $\sum_{n=1}^{\infty} \frac{2^n}{n!}$

5. $\sum_{n=1}^{\infty} \frac{\sqrt{n-1}}{n+2}$

6. Find $\lim_{n\to\infty} \sqrt[n]{2n+1}$ (Show ALL Work)

7. Does $\sum_{n=1}^{\infty} (-1)^n \frac{1}{\ln \ln n}$ diverge, absolutely converge or conditionally converge? JUSTIFY your answer

8. Graph $r = \sin 2\theta$ in polar co-ordinates

9. $\int_0^{\ln 2} \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$ simplifies to one term – do it.

10. Find the area inside the circle $r = 3\cos\theta$ but outside the cardioid $r = 1 + \cos\theta$

CAL 2 FINAL 20 Apr 92 name _____

show ALL work number _____

1. Given $u>0$ and $\cosh u = \frac{17}{15}$, find $\sinh u$ and $\tanh u$

2. Given $\ln(y-2) = \ln(\sin x) - x$, solve for y and simplify.

3. Write the Maclaurin series for the given functions. (Use Σ notation)
[hint: use known series for e^x, $\sin x$]

A. e^{3x} B. $\sin x^3$ C. $\int_0^x \sum_{n=0}^{\infty} a_n t^n \, dt$

4. Find $\frac{dy}{dx}$ given

A. $y = x^4 + 4^x + x^x + 4^4$ B. $y = \log_4 x + \log_x 4 + \log_x x + \log_4 4$

5. Use the integral test to check the convergence of $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

6. $\int x \sin 3x \, dx =$

7. $\int_0^1 \frac{2x \, dx}{(x+1)(x+2)}$ simplifies to one term — do it.

In 8&9 determine if the series converges or diverges JUSTIFY your answers

8. $\sum_{n=0}^{\infty} \frac{4^n}{(2n)!}$

9. $\sum_{n=4}^{\infty} \frac{3^n}{n^2-1}$

In 10&11 find the interval of convergence. JUSTIFY your answers

10. $\sum_{n=0}^{\infty} \frac{x^n}{n^2}$

11. $\sum_{n=0}^{\infty} \frac{x^n}{n3^n}$

In 12&13 ~~Simplify the integrals~~ Integrate & Simplify

12. $\int_0^{\pi/4} \tan^3 x \, dx$

13. $\int_0^1 \frac{12\,dx}{\sqrt{4-x^2}}$

14. Graph $r = \sin 3\theta$ in polar co-ordinates and find the area of one of the petals.

15. Find and simplify an equation of the tangent line to $f(x) = \arcsin x$ at $x = \frac{1}{2}$

16. The curve $f(x) = \frac{1}{x^3}$ from 4 to ∞ is rotated about the x-axis, find the volume.

17. Find the equation of the circle which passes through the points $(0,0)$, $(4,0)$ and $(1,1)$. Find the center of the circle and its radius

18. $y = f(t)$ satisfies $\frac{y'}{y} = \text{constant}$, $f(0) = 8$ and $f(10) = 256$. Find an equation of $f(t)$ in terms of t and $f(14)$.

19. Graph $y = xe^{-x}$. Label max, mins, points of inflection and show limits as $x \to \pm\infty$

20. Use the remainder estimation theorem to estimate the error of using $1 + x + \frac{x^2}{2}$ to approximate e^x for $|x| < \frac{1}{2}$ [use $\sqrt{e} < 2$]