(6pts) Which equation below is the equation of an ellipse with its major axis the $x$–axis? $x^225+y^236=1$ $x^236+y^225=1$ $x^225-y^236=1$ $x^236-y^225=1$ $x^236+y^225=0$

(6pts) Which equation below is that of a hyperbola with foci $(\pm 4,0)$? $x^25-y^23=1$ $-x^25+y^23=1$ $x^214-y^22=1$ $x^29-y^27=0$ $-x^214+y^22=1$

(6pts) The graph of $x=y^220$ is a parabola with directrix the line $x=5y=5x=0x=-5y=-5$

(6pts) Find the slope of the tangent line to the parameterized curve $x=t^2+3t+1$, $y=t^3-2t$ when $t=2$. $1077101-27-72$

(6pts) Which integral below represents the arclength of the cycloid $x=a(t-\sin t)$, $y=a(1-\cos t)$; $0\le t\le 2\pi$? $\sqrt{2a^2}_0^{2\pi}\sqrt{1-\cos t+\sin t}\,dt$ $\sqrt{2a^2}_0^{2\pi}\sqrt{t-\sin t+1-\cos t}\,dt$ $\sqrt{2a^2}_0^{2\pi}\sqrt{1-\cos t}\,dt$ $\sqrt{2a^2}_0^{2\pi}\sqrt{1+\cos t}\,dt$ $\sqrt{2a^2}_0^{2\pi}\sqrt{1-\sin t}\ dt$

(6pts) The parameterized curve $x=t^3+2t$, $y=\cos t$; $-\infty<t<\infty$ is also the graph of a function $y=f(x)$. What is the coefficient of $x^2$ in the Mclaurin series expansion for $f(x)$? $-12-1801812$

(6pts) The function $f(x)=x\sin x$ has one critical point for $-\pi 2<x<\pi 2$. Where is it and determine whether it is a local minima, maxima or neither. $x=0$, local max$x=0$, local min$x=0$ neither $x=\pi 4$, local max$x=\pi 4$, local min

(6pts) Which number below is equal to $\log_3(81)$ ? $-4-2024$

(6pts) Let $f(x)=x+\ln x$ for $x>0$. Find $df^{-1}dx(e+1)$.

$f$ is not one to one $e$ $1e+1$ $ee+1$ $1+1e$

(6pts) A certain bacteria culture, undergoing natural growth, doubles in size after 4 minutes. If there were 100 specimens at time $t=0$, when will the number have increased to 1600 specimens? 2 weeks 1 day 3 hours, 20 minutes 2 hours 16 minutes

(6pts) Let $f(x)={}_0^x e^{-t^2}\,dt$. Find the Mclaurin series for $f(x)$. $\sum_{n=0}^{\infty}(-1)^n x^{n+1}(n+1)!$ $\sum_{n=0}^{\infty}x^{2n+1}n!$ $\sum_{n=0}^{\infty}(-1)^n x^{2n+1}(2n+1)n!$ $\sum_{n=0}^{\infty}(-1)^{n+1}x^{3n}(3n)n!$ $\sum_{n=0}^{\infty}(-1)^n x^{2n+1}(2n)!$

(6pts) Calculate ${}_{u\to\infty}u^3+5u^2-2u+103u^2+7u-8$. $\infty$ 53 $-27$ $-54$ 13

(6pts) The solution to the initial value problem $xy'=y+x^3$, $y(1)=1$ is $y=x^3$ $y=e^{x-1}+1$ $y^2+y=x^2+x$ $y=x^2+23$ $y=x^34+34x$

(6pts) The improper integral ${}_1^{\infty}1x^{1.01}\,dx$ converges to 11.01 converges to 1.01 converges to .01 converges to 100 diverges

(6pts) The partial fraction expansion of $x+7x^2+4x+3$ is $2x-1+3x-33x+1-2x+3$ $5x+1+4x+34x+1-3x+3$ $x+7x^2+4x+3$

(6pts) ${}_0^3xe^x\,dx$ $3e^33e^3-32e^3+12e^33e^2$

(6pts) Which expression below is equal to ${}_0^{12}\sqrt{1-x^2}\ dx$? ${}_0^{\pi 6}\cos\theta\,d\theta$ ${}_0^{\pi 6}\cos^3\theta\,d\theta$ ${}_0^{\pi 6}\cos^2\theta\,d\theta$ ${}_0^{\pi 6}\sin^2\theta\,d\theta$ ${}_0^{\pi 6}\sin\theta\,d\theta$

(6pts) *According to the limit comparison test* for definite integrals, what can we say about the two improper integrals ${}_0^{\infty}x^2-3x+10x^4+2x^2+4\,dx$ and ${}_0^{\infty}x^4-3x^2+10x^6+x^4+9\,dx$? Either they both converge or they both diverge. They both converge. They both diverge. The first diverges but the second converges. The first converges but the second diverges.

(6pts) Determine whether the following series converge or diverge.

$$1)\sum_{n=1}^{\infty}(-1)^n n\,,\qquad 2)\sum_{n=1}^{\infty}1n!\,,\qquad 3)\sum_{n=2}^{\infty}\sqrt[3]{n^3-1}3n-1.$$

1) 2) and 3) converge 1) absolutely converges, 2) and 3) diverge 1) conditionally converges, 2) and 3) diverge 1) conditionally converges, 2) absolutely converges and 3) diverge 1) 2) and 3) diverge

(6pts) Find the radius $R$ of convergence of the following power series

$$\sum_{n=1}^{\infty}(n!)^2(2n)!(x-5)^n\ .$$

$R=0R=\infty R=4R=5R=\sqrt{5}$

(6pts) All of the series below have radius of convergence 1. Which one conditionally converges at both endpoints of its interval of convergence?

$\sum_{n=1}^{\infty} (-1)^n \; x^n n - 1$ $\sum_{n=1}^{\infty} (-1)^n \; x^{2n} n$ $\sum_{n=1}^{\infty} (-1)^n \; x^{2n} n^2 - 1$ $\sum_{n=1}^{\infty} (-1)^n \; x^{3n} n$ $\sum_{n=1}^{\infty} (-1)^n \; x^{3n} n^3$

(6pts) What is the behavior of the series $\sum_{n=1}^{\infty} 1 (\arctan n)^2 (1+n^2)$ ? It converges absolutely. It converges conditionally. It diverges.

(6pts) Give the first three nonzero terms of the Maclaurin series expansion of $e^{x^2} \sin x$. $x - 13x^3 - 1120x^5$ $1 + 3x^2 + 16x^4$ $x - x^3 + x^7$ $x + 56x^3 + 41120x^5$ $x + x^2 - x^3$

(6pts) Which series conditionally converges? $\sum_{n=2}^{\infty} 1n^2 \ln n$ $\sum_{n=2}^{\infty} 1n \ln n$ $\sum_{n=2}^{\infty} (-1)^{n+1} n \ln n$ $\sum_{n=2}^{\infty} (-1)^{n+1} n^2 \ln n$ $\sum_{n=2}^{\infty} 1n^2 + n \ln n$

(5pts) Find the sum of the following series

$$\sum_{n=0}^{\infty} 2^{n-2} 3^n \; .$$

diverges$34e^{2/3}13$