

Calculus II; Quiz 0

1. Print your name. You must print it legibly. Also mention your year in school and your probable major.
2. Why are you taking this course ? Will you be taking other math or statistics courses ?
3. When and from whom did you take Calculus I ?
4. What material in Calculus I gave you the most trouble ?
5. How many hours per week do you plan to put into this class ? What will you do if you start having difficulties with the material ?
6. Why are you taking a night course ? Are you aware that they are often more demanding on the student ?
7. What grade do you honestly expect to get from this class ? Why ?

0. Print your name: _____

1. Find $\int \frac{x}{x^4 + 1} dx$

2. Find $\int x \cdot \cos(x) dx$

3. Find $\int_{-3}^{+3} x e^{-x^4} dx$

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1. Find $\int e^{2x} \sin(3x) dx$

2. Find $\int x^3 \cdot \cos(x^2 + 1) dx$

3. Find the partial fraction decomposition for $y = \frac{5x}{(x-2)(x+3)}$

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1. Find $\int \frac{x+7}{x^2-x-2} dx$

2. Using the substitution $x = \tan(u)$, find $\int \frac{1}{(x^2+1)^{\frac{5}{2}}} dx$

3. How many rectangles should you use with the midpoint rule in order to approximate the integral $\int_0^1 \cos(x^2+1) dx$ with an error less than 0.00001 ?

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1. Find the volume of the solid obtained by rotating about the x -axis the region bounded by the curves $y = \tan(x) \sec(x)$, the x -axis, $x = 0$ and $x = \pi/4$.

2. Find the volume obtained by rotating about the y -axis the region bounded by $y = e^x$, the x -axis, $x = 0$ and $x = 1$.

3. Find the arc-length of the section of the curve $y = \frac{3}{2}x^{\frac{2}{3}}$ from $x = 0$ to $x = 1$

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1. Find the arc-length of the section of the curve $y = x^{\frac{3}{2}}$ from $x = 0$ to $x = 1$

2. Set up (but don't evaluate) an integral that gives the surface area obtained by rotating the curve $y = e^x$ from $x = 0$ to $x = 1$ about the x -axis.

3. Find the average value of $y = x \sin(x)$ over the interval $[1, 3]$. Draw a graph that shows the geometric significance of the average value.

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1. Show that $y = xe^x$ is a solution to $y'' - 2y' + y = 0$

2. Find the centroid of unit quarter-circle $y = \sqrt{1 - x^2}$ for $0 \leq x \leq 1$.

3. For what value of K is $f(x) = \frac{K}{1 + x^2}$ for $0 \leq x \leq +\infty$ a probability distribution ?

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1. Determine whether or not the sequence $a_n = \frac{n \cdot \ln(n)}{n^2 + 1}$ converges. If it converges, find its limit.

2. Find the sum $\frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \frac{1}{32} - \frac{1}{64} + \dots$

3. The Fibonacci sequence can be defined by $a_1 = a_0 = 1$ and $a_{n+1} = a_n + a_{n-1}$ for $n \geq 1$. It is easy to see that it diverges to infinity (don't bother showing this). However, the sequence of ratios of successive terms $r_n = \frac{a_{n+1}}{a_n}$ converges. Find its limit.

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2. Determine whether or not the series $\sum_{n=1}^{+\infty} \frac{n}{e^{n^2}}$ converges

3. Use the partial sum $\sum_{n=1}^5 \frac{1}{n^3}$ to get an upper and lower estimate of $\sum_{n=1}^{+\infty} \frac{1}{n^3}$.

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1. Find the radius of convergence of the power series $\sum_{n=1}^{+\infty} e^n x^n$.

2. Find a power series for $y = \frac{3}{4-x}$. For what x does it converge?

3. Find the Taylor series for $y = e^{-x^2}$ and use the first three terms to approximate the integral $\int_0^1 e^{-x^2} dx$.

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1. Find the Maclaurin series for e^x , $\cos(x)$, and $\sin(x)$.

2. Find a power series for $y = \frac{3x}{(1+2x)^{1/2}}$.

3. Use power series to find the Taylor polynomial P_4 of the solution to the initial value problem $y' + y = 2x + x^2$ with $y(0) = 1$.

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1. Express the vector $\vec{V} = \overrightarrow{(2, 1, -1)}$ as a sum of two other vectors $\vec{U} + \vec{W}$, where \vec{U} is parallel to the plane $x - y + 3z = 9$ and \vec{W} is perpendicular to the plane.

2. Let $A = (2, 6, 7)$ and $B = (-4, 2, 5)$ Find the equation of the line passing through the midpoint of the segment AB and the point $C = (-2, 3, 0)$.

3. Find the equation of the plane that contains the points $(1, 2, 5)$, $(-4, 0, 1)$ and $(0, 2, 1)$.