Brief Article

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$IhavenotviolatedtheHonorCodeinanywaywithregardtothiswork.$

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Math 105 – Test 3 November 16, 1995 =4

Let $y = s - s^3$ and $s = \frac{1}{t^2}$. Then $\frac{dy}{dt} =$

$-2(1 - \frac{3}{t^4})\frac{1}{t^3}$ $(1 - \frac{3}{t^4})\frac{1}{t^2}$ $2(1 - \frac{3}{t^4})\frac{1}{t^3}$ $-(1 - \frac{3}{t^4})\frac{1}{t^2}$ $1 - \frac{3}{t^4}$

The slope of the graph of the equation $x^3y^2 - 2x = 2$ at $(1, 2)$ is equal to

$-\frac{5}{2}$ $\frac{5}{2}$ 3 $-\frac{1}{2}$ 2

A point is moving along the graph $x^2 + y^4 = 2$. When the point is at $(1, 1)$, its x coordinate is changing at a rate of 4 units per second. How fast is the y coordinate changing at that moment?

-2 3 -3 1 2

The function $f(x) = \frac{2^{2x+1} \cdot 3^{-2x}}{6^{2x}}$ is the same as

$\frac{2}{3^{4x}}$ $\frac{2^{2x}}{3^{4x}}$ $\frac{3}{6^{2x+1}}$ $\frac{2}{6^{2x}}$ $\frac{3^{-2x}}{2^{2x}}$

Solve the equation $(2 - x)e^{3x+1} - e \cdot e^{3x} = 0$ for x. $x = 1$ $x = \frac{3}{2}$ $x = \frac{1}{2}$ $x = 2$ $x = \frac{5}{2}$

The value of $e^{4\ln(3-2\ln e)}$ is the same as

1 0 2 e 4

The derivative of $\frac{e^x}{x^2}$ is

$\frac{x^2e^x - 2xe^x}{x^4}$ $\frac{e^x}{2x}$ $\frac{2xe^x - x^2\ln(x)}{x^4}$ $\frac{2xe^x - x}{x^4}$ $\frac{1}{2}$

The function $f(x) = e^{x^2-6x+3}$ has a relative minimum at the point

$x = 3$ $x = 1$ $x = 2$ $x = 4$ $x = 0$

Determine all functions $y = f(x)$ such that $y' = -\frac{1}{3}y$ and $f(0) = 3$.

$f(x) = 3e^{-\frac{1}{3}x}$ $f(x) = -\frac{1}{3}e^{3x}$ $f(x) = Ce^{-\frac{1}{3}x}$ $f(x) = 3e^{-3x}$ $f(x) = Ce^{-3x}$

Solve the equation $\ln(\ln(x) + \ln(x)) = 0$.

$x = \sqrt{e}$ $x = \pm\sqrt{e}$ $x = 0$ $x = 1$ There are no solutions.

The derivative of $f(x) = e^x + \ln(x) + \ln(\pi) + e^{\ln(3)}$ is equal to

$e^x + \frac{1}{x}$ 0 $e^x + \frac{1}{x} + \frac{1}{\pi} + e^{\ln(3)}$ 1 $\frac{e^x}{x}$

The derivative of $f(x) = \ln(x^6 - x^2 + 1)$ is equal to

$\frac{6x^5-2x}{x^6-x^2+1}$ $\frac{1}{x^6-x^2+1}$ $6x^5 - 2x$ $(6x^5 - 2x)\ln(x^6 - x^2 + 1)$ $\ln(6x^5 - 2x)$

The function $y = \ln(4 - x^2)$

has domain $(-2, 2)$ and a relative max at $x = 0$. has domain $(-2, 2)$ and a relative min at $x = 0$. has domain $[-2, 2]$ and a relative min at $x = 0$. has domain $[-2, 2]$ and a relative max at $x = 0$. has domain $(-2, 2)$ and is always increasing.

The derivative of $e^{3x}\ln(2x)$ is equal to

$3e^{3x}\ln(2x) + \frac{e^{3x}}{x}$ $3e^{3x}\ln(2x) + \frac{e^{3x}}{2x}$ $e^{3x}\ln(2x) + \frac{e^{3x}}{x}$ $3e^{3x}\ln(2x) + 2e^{3x}$ $\frac{e^{3x}}{2x}$

The function $f(x) = \frac{-\ln(x)}{2x}$, defined for $x > 0$, has one relative extreme point. Find this point.

$x = e$ $x = \frac{1}{e}$ $x = \sqrt{e}$ $x = -2e$ $x = e^{-2}$

Use logarithmic differentiation to differentiate $y = \frac{(4x+1)(3x^2-1)(x^3+3)}{x^4}$.

$y' = y\left(\frac{4}{4x+1} + \frac{6x}{3x^2-1} + \frac{3x^2}{x^3+3} - \frac{4}{x}\right)$ $y' = y\left(\frac{72x^5+15x^4+39x^2+6x+4}{4x^3}\right)$ $y' = \frac{4}{4x+1} + \frac{6x}{3x^2-1} + \frac{3x^2}{x^3+3} - \frac{4}{x}$ $y' = \ln(4x + 1) + \ln(3x^2 - 1) + \ln(x^3 + 3) - 4\ln(x)$ $y' = \frac{72x^5+15x^4+39x^2+6x+4}{4x^3}$

A population of bacteria is given by $P(t) = P_0e^{kt}$ where t denotes time measured in seconds and k and P_0 are some constants. If after 20 seconds the population triples, find the value of k.

$\frac{\ln(3)}{20}$ $\frac{20}{\ln(3)}$ $\frac{\ln(2)}{20}$ $\ln(3)$ $\ln\left(\frac{3}{20}\right)$

The decay constant of a radioactive substance is $\frac{\ln(2)}{10}$, where the time is measured in years. How long will take for a given quantity to diminish to one tenth of its present amount?

$\frac{10\ln(10)}{\ln(2)}$ years $10\ln(5)$ years 10 years never 10 years

The growth rate of a certain cell culture is proportional to its population. In 4 hours the cell population grows from an initial population of one million to two million. What will the population of the cell culture be after one day?

64 million 32 million 128 million 16 million 8 million

Suppose you invest \$1000 in a bank account which pays 10% interest per year compounded monthly. After a year this investment is worth

$\$1000(1+\frac{.10}{12})^{12}$ \$1000 $\$1000(1+\frac{10}{12})^{12}$ $\$1000(1+.10)$ $\$1000(1+.10)^{12}$

Solve the equation $2\cdot 3^{x^2}-18=0$ for x.

$x=\sqrt{2}$ and $x=-\sqrt{2}$ $x=\sqrt{3}$ and $x=-\sqrt{3}$ $x=\frac{2}{3}$ and $x=-\frac{2}{3}$ $x=\frac{1}{2}$ and $x=-\frac{1}{2}$ there is not solution.

The derivative of $f(x)=(e^3+x^3)e^{2x}$ is equal to

$3x^2e^{2x}+2(e^3+x^3)e^{2x}$ $3(e^2+x^2)e^{2x}+2(e^3+x^3)e^{2x}$ $3x^2e^{2x}$ $2(e^3+x^3)e^{2x}+3(e^2+x^2)$ $2(e^3+x^3)e^{2x}$

Solve the equation $5e^{x+2}-15=0$ for x

$x=\ln 3-2$ $x=\ln 2-1$ $x=0$ $x=2+\ln 3$

$[e^{\ln(e)\ln(2)}]^{-2}$ is equal to

$\frac{1}{4e^2}$ $4e^2$ $\ln(2)^2$ 0 e

Solve the equation $e^{\ln(x^2-2x)}=3$.

$x=-1,3$ There are no solutions $x=0$ $x=3$ only $x=0,2$

The derivative of $f(x)=\ln\left(\frac{3x^2e^{x+1}}{\sqrt{2x-1}}\right)$ is equal to

$\frac{2}{x}+1-\frac{1}{x-1}$ $\frac{2}{x}+1+\frac{1}{x-1}$ $\ln(3)+2\ln(x)+\ln(e^{x+1})-\frac{1}{2}\ln(2x-1)$ $\frac{2}{x}+\frac{1}{e^{x+1}}-\frac{1}{2(2x-1)}$ $\frac{2}{x}+1-\frac{1}{2(x-1)}$

You have a large amount of money which you would like to invest wisely. Which of the following is the better investment?

A bank account which pays 10% per year compounded continuous. A bank account which pays 10% per year compounded yearly. A bank account which pays 10% per year compounded continuous. A bank account which pays 10% per year compounded monthly. They are all equally good investments.

You decide to buy a TV for \$500 on a no payments for year no money down deal. Assuming the interest is compounded continuously at a rate of 10% and no payments are made, how much will you own in a year?

$\$500e^{.1}$ \$500 $\$500e^{10}$ \$1000 $\$500e$