

在线课外作业系统

测试任务工作表

2024/10/7 - EDT 上午1:17:17

名称: _____

课程编号: # _____

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课程: MAT1320[A] Calculus I [LEC] 20249

章节编号: # _____

测试任务: Assignment 4

试题 1: (1 分)

If

$$f(x) = \ln(2x + 1),$$

then its third derivative is $f^{(3)}(x) =$ _____

试题 2: (1 分)

Find the equation of the tangent line to the curve

$$y = 2 \ln(x^5 e^{x^4})$$

at the point $(1, 2)$. (Hint: simplify before differentiating.) Your answer must be an equation of the form $y = mx + b$.

试题 3: (1 分)

Find the derivative of the function

$$f(x) = (2x + 1)^{\ln(3x+5)}$$

and then evaluate it at $x = 0$.

$$f'(0) = \text{_____}.$$

试题 4: (1 分)

Evaluate

$$\lim_{h \rightarrow 0} \frac{\ln(4+h) - \ln(4)}{h}$$

试题 5: (1 分)

Find the x -coordinate of the point at which the tangent to the curve

$$y = x^{x^4}, \quad x > 0$$

is horizontal. Give the exact value of x . (Note that by the order of operations, $y = x^{(x^4)}$, not $(x^x)^4 = x^{4x}$!)

$x =$ _____

试题 6: (1 分)

If $f(x) = \frac{x^4 + 2 \arcsin(x)}{3 \cos(x)}$, find $f'(0)$.

FORMATTING: Your answer should be exact. Remember to write symbols like π and \sqrt{x} as **pi** and **sqrt(x)**, respectively.

Answer: $f'(0) =$ _____

试题 7: (1 分)

Match the following numbered functions with their derivatives:

试题 8: (1 分)

Consider the function $f(x) = \frac{1}{5} \arccos(x) + 2 \arctan(x^2)$.

Evaluate the derivative of f at $x = 0$.

FORMATTING: Give an exact answer, not a decimal approximation. Remember that \sqrt{x} is written as **sqrt(x)** in the response area.

Answer: $f'(0) =$ _____

试题 9: (1 分)

Consider the function

$$f(x) = (\arctan(x))^3 + 3 \arctan(x) + 3.$$

What is the derivative of $f(x)$?

FORMATTING: In Mobius, $\arctan(x)$ is written **arctan(x)**.

Answer: $f'(x) =$ _____

试题 10: (1 分)

Consider the function

$$g(x) = \arcsin(e^{3x}) + 4.$$

What is the derivative of $g(x)$?

FORMATTING: Give an exact answer, not a decimal approximation. If needed: in Mobius, $\arcsin(x)$ is written simply **arcsin(x)** and \sqrt{x} is written as **sqrt(x)**.

Answer: $g'(x) =$ _____

试题 11: (1 分)

The function y is given implicitly by the equation

$$y^3 \ln(y) - x^6 \ln(x) = 6$$

Find the derivative of y as a function of x and y .

Answer: $y' =$ _____

试题 12: (1 分)

By implicit differentiation, find the equation of the tangent line to the curve

$$x^2 + 4xy^2 - y = 6$$

at the point $(1, -1)$. Provide this equation in the form $y = ax + b$.

Answer: _____

试题 13: (1 分)

Consider the equation

$$x^3 + y^5 = 5xy + 1 .$$

a) Use implicit differentiation to find the derivative of y with respect to x . Your answer will be a function of both x and y .

$$\frac{dy}{dx} = \underline{\hspace{2cm}}$$

b) Now find the equation of the tangent line to the curve described by $x^3 + y^5 = 5xy + 1$ at the point $(0, 1)$.

Answer: $\underline{\hspace{2cm}}$

FORMATTING: Your answer must be in the form of an equation for y in terms of x ; e.g. $y = ax + b$.

试题 14: (1 分)

Suppose that $f : \mathbf{R} \rightarrow \mathbf{R}$ is a differentiable function that satisfies

$$(f(t))^2 = t^2 f(t) + 4t^2 + 16$$

for all $t \in \mathbf{R}$. Knowing that $f(1) = 5$, find $f'(1)$. Provide the exact value.

Answer: $f'(1) = \underline{\hspace{2cm}}$

Hint: Use implicit differentiation. If two differentiable functions are equal for all t , then so are their derivatives.

试题 15: (1 分)

Let

$$y^5 + x^2 y^5 = e^{3x} .$$

Use implicit differentiation to find a formula for $\frac{dy}{dx} = \underline{\hspace{2cm}}$.

Your answer can be a function of both x and y .
