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14.5 Regla Cadena y Derivación Implicita (Homework)

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Current Score

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	13
POINTS	–/1	–/1	–/2	–/2	–/1	–/0 ★	–/1	–/1	–/1	–/0 ★	–/1.5	–/2.5	–/1

TOTAL SCORE: –/15 0.0%

Due Date

SAT, MAR 7, 2020
11:59 PM CST

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Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

1. –/1 points — SCALCET8 14.5.001. — My Notes — Ask Your Teacher

Use the Chain Rule to find dz/dt.

$z = xy^9 - x^2y, \quad x = t^2 + 1, \quad y = t^2 - 1$

$\frac{dz}{dt} =$

2. –/1 points — SCALCET8 14.5.005. — My Notes — Ask Your Teacher

Use the Chain Rule to find dw/dt.

$w = xe^{y/z}, \quad x = t^5, \quad y = 4 - t, \quad z = 2 + 3t$

$\frac{dw}{dt} =$

3. –/2 points — SCALCET8 14.5.012. — My Notes — Ask Your Teacher

Use the Chain Rule to find $\partial z/\partial s$ and $\partial z/\partial t$.

$z = \tan(u/v), \quad u = 9s + 5t, \quad v = 5s - 9t$

$\frac{\partial z}{\partial s} =$

$\frac{\partial z}{\partial t} =$

4. –/2 points — SCALCET8 14.5.023. — My Notes — Ask Your Teacher

Use the Chain Rule to find the indicated partial derivatives.

$w = xy + yz + zx, \quad x = r\cos(\theta), \quad y = r\sin(\theta), \quad z = r\theta;$

$\frac{\partial w}{\partial r}, \frac{\partial w}{\partial \theta}$ when $r = 6, \theta = \frac{\pi}{2}$

$\frac{\partial w}{\partial r} =$

$\frac{\partial w}{\partial \theta} =$

5. –/1 points — SCALCET8 14.5.027. — My Notes — Ask Your Teacher

Use this equation to find dy/dx.

$4y\cos(x) = x^2 + y^2$

$\frac{dy}{dx} =$

6. –/0 points SCALCET8 14.5.029. My Notes Ask Your Teacher

Use this equation to find dy/dx.

$$4\tan^{-1}(x^2y) = x + xy^2$$

$\frac{dy}{dx} =$

7. –/1 points SCALCET8 14.5.031. My Notes Ask Your Teacher

Use the equations to find $\partial z/\partial x$ and $\partial z/\partial y$.

$$x^2 + 8y^2 + 3z^2 = 1$$

$\frac{\partial z}{\partial x} =$

$\frac{\partial z}{\partial y} =$

8. –/1 points SCALCET8 14.5.035.MI. My Notes Ask Your Teacher

The temperature at a point (x, y) is $T(x, y)$, measured in degrees Celsius. A bug crawls so that its position after t seconds is given by $x = \sqrt{2 + t}$, $y = 4 + \frac{1}{2}t$, where x and y are measured in centimeters. The temperature function satisfies $T_x(2, 5) = 8$ and $T_y(2, 5) = 5$.

How fast is the temperature rising on the bug's path after 2 seconds? (Round your answer to two decimal places.)

°C/s

9. –/1 points SCALCET8 14.5.502.XP. My Notes Ask Your Teacher

Use the Chain Rule to find dz/dt.

$$z = \cos(x + 7y), \quad x = 2t^3, \quad y = 4/t$$

$\frac{dz}{dt} =$

10. –/0 points SCALCET8 14.5.509.XP. My Notes Ask Your Teacher

If $z = f(x, y)$, where f is differentiable, and

$x = g(t)$ $y = h(t)$

$g(5) = -7$ $h(5) = 8$

$g'(5) = 4$ $h'(5) = -5$

$f_x(-7, 8) = 2$ $f_y(-7, 8) = -6$

find dz/dt when $t = 5$.

$\frac{dz}{dt} =$

11. –/1.5 points SCALCET8 14.5.512.XP. My Notes Ask Your Teacher

Use the Chain Rule to find the indicated partial derivatives.

$$z = x^3 + xy^4, \quad x = uv^4 + w^3, \quad y = u + ve^w$$

$\frac{\partial z}{\partial u}, \frac{\partial z}{\partial v}, \frac{\partial z}{\partial w}$ when $u = 1$, $v = 1$, $w = 0$

$\frac{\partial z}{\partial u} =$

$\frac{\partial z}{\partial v} =$

$\frac{\partial z}{\partial w} =$

12. –/2.5 points SCALCET8 14.5.AE.002. My Notes Ask Your Teacher

Video Example

EXAMPLE 2 The pressure P (in kilopascals), volume V (in liters), and temperature T (in kelvins) of a mole of an ideal gas are related by the equation $PV = 8.31T$. Find the rate at which the pressure is changing when the temperature is 200 K and increasing at a rate of 0.3 K/s and the volume is 100 L and increasing at a rate of 0.4 L/s.

SOLUTION If t represents the time elapsed in seconds, then at the given instant, we have $T = 200$, $dT/dt = 0.3$, $V = 100$, $dV/dt = 0.4$. Since

$$P = 8.31\frac{T}{V}$$

the Chain Rule gives the following. (Round your final answer to five decimal places.)

$$\frac{dP}{dt} = \frac{\partial P}{\partial T}\frac{dT}{dt} + \frac{\partial P}{\partial V}\frac{dV}{dt}$$

$$= \frac{8.31}{V}\frac{dT}{dt} - \left(\quad\right)\frac{dV}{dt}$$

$$= \frac{8.31}{100}\left(\quad\right) - \frac{8.31(200)}{100^2}\left(\quad\right)$$

$$=$$

The pressure is decreasing at a rate, rounded to three decimal places, of about kPA/s.

13. –/1 points SCALCET8 14.5.525.XP. My Notes Ask Your Teacher

Use these equations to find $\partial z/\partial x$ and $\partial z/\partial y$ for the following.

$yz = 4\ln(x + z)$

$\frac{\partial z}{\partial x} =$

$\frac{\partial z}{\partial y} =$

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