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HW7-Due Feb 24 2009 M281 (526903)

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About this Assignment

Due: **Tue Feb 24 2009 08:00 PST**


1. SCalc5 15.5.009. [295107] [Show Details](#)

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

$$z = x/y, x = se^t, y = 1 + se^{-t}$$

$\partial z/\partial s =$

$\partial z/\partial t =$

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2. SCalc5 15.5.014. [295015] [Show Details](#)

Let $W(s, t) = F(u(s, t), v(s, t))$, where $u(1, 0) = 2$, $u_s(1, 0) = -2$, $u_t(1, 0) = 6$, $v(1, 0) = 3$, $v_s(1, 0) = 5$, $v_t(1, 0) = 4$, $F_u(2, 3) = -1$, and $F_v(2, 3) = 10$. Find the following.

$W_s(1, 0) =$

$W_t(1, 0) =$

3. SCalc5 15.5.022. [349817] [Show Details](#)

Use the Chain Rule to find the $\partial u/\partial s$ and $\partial u/\partial t$ when $s = 0$ and $t = 9$.

$$u = xy + yz + zx$$

$$x = st$$

$$y = e^{st}$$

$$z = t^2$$

$\partial u/\partial s =$

$\partial u/\partial t =$

4. SCalc5 15.5.032. [295032] [Show Details](#)

Use Equation 6 to find dy/dx .

$$y^5 + x^2y^3 = 1 + ye^{x^2}$$

$dy/dx =$

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5. SCalc5 15.5.038. [295017] [Show Details](#)

The radius of a right circular cone is increasing at a rate of 1.8 in/s while its height is decreasing at a rate of 2.5 in/s. At what rate is the volume of the cone changing when the radius is 129 inches and the height is 146 inches?

in³/s

6. SCalc5 15.5.040. [295072] [Show Details](#)

The voltage V in a simple electrical circuit is slowly decreasing as the battery wears out. The resistance R is slowly increasing as the resistor heats up. Use Ohm's Law, $V = IR$, to find how the current I is changing at the moment when $R = 400 \Omega$, $I = 0.08 \text{ A}$, $dV/dt = -0.01 \text{ V/s}$, and $dR/dt = 0.03 \Omega/s$.

A/s

7. MW7-1M281 [776954] [Show Details](#)

Problem 7.1. The equation $x^4 + xyz^3 + 4z = 4$ defines a surface S which contains the point $P = (-1, 1, 1)$.

- (1) Find a parametric representation of the normal line to the surface S at of the form $\gamma(t) = (-1, 1, 1) + t(A, B, 1)$.
- (2) Find an equation of the form $a(x+1) + b(y-1) + (z-1) = d$ for the tangent plane to the surface S at the point P .



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	A (an answer xx.xx is desired)
	B (an answer xx.xx is desired)
	a (an answer xx.xx is desired)
	b (an answer xx.xx is desired)
	d (an answer xx.xx is desired)

8. HW7-2M281 [776955] [Show Details](#)

Problem 7.2. Penguin is walking on a glacier in antartica. The height of the glacier is $h(x, y) = 3x^2 + 2xy - y^2$ units above sea level and she is located at the point $(1, 2)$. Suddenly a snow storm comes up.

- (1) Please find the unit direction (A,B) in which she should walk to go downhill toward the sea as rapidly as possible to get out of the snow storm.
- (2) How rapidly is her height changing as she walks in this direction?



	A (an answer x.xxx is desired)
	B (an answer x.xxx is desired)
	rate of change of height (an answer xxx.xxx is desired)

9. HW7.3M281 [776956] [Show Details](#)

Problem 7.3.

- (1) Let $f(x, y) = x^2 + 2xy$ and let $\gamma(t)$ be a curve with $\gamma(1) = (2, 3)$ and $\gamma'(1) = (3, 4)$. Let $h(t) = f(\gamma(t))$. Find $\frac{\partial h}{\partial t}(1)$.
- (2) Let $f(u, v) = (u^2 + v^2)^2$ and let $u = 2x + y$ and $v = 2x + 2y$. Use the chain rule to determine $\frac{\partial f}{\partial x}$ when $x = 1$ and $y = 1$.
- (3) Penguin is climbing a hill whose shape is given by the equation $z = f(x, y) = x^2y$. she is located at the point corresponding to $x = 2$ and $y = 3$. How rapidly is her height increasing as she walks in the direction northeast?



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(1) an answer xx is desired

(2) an answer xxxx is desired

(3) an answer xx.xx is desired

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