

WebAssign**Hw 14 (14.5-6): Chain Rule; Gradient Vector (Homework)**

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MA 261 Fall 2012, section 121, Fall 2012

Instructor: David Daniels

Current Score : 20 / 20**Due** : Tuesday, September 25 2012 11:00 PM EDT**1.** 2/2 points | [Previous Answers](#)

SCalcET7 14.5.027.

Use this [equation](#) to find dy/dx .

$$3y \cos x = x^2 + y^2$$

$$\frac{dy}{dx} =$$

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SCalcET7 14.5.029.

Use this [equation](#) to find dy/dx .

$$8 \tan^{-1}(x^2 y) = x + xy^2$$

$$\frac{dy}{dx} =$$



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SCalcET7 14.5.035.MI.

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 $x = \sqrt{4 + t}$, $y = 4 + \frac{1}{5}t$, where x and y are measured in centimeters. The temperature function satisfies $T_x(3, 5) = 6$ and $T_y(3, 5) = 2$. How fast is the temperature rising on the bug's path after 5 seconds? (Round your answer to two decimal places.)

 °C/s
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SCalcET7 14.5.038.MI.

The radius of a right circular cone is increasing at a rate of 1.6 in/s while its height is decreasing at a rate of 2.9 in/s. At what rate is the volume of the cone changing when the radius is 106 in. and the height is 142 in.?



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✓ in³/s

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SCalcET7 14.6.005.

Find the directional derivative of f at the given point in the direction indicated by the angle θ .

$$f(x, y) = 2ye^{-x}, \quad (0, 8), \quad \theta = 2\pi/3$$

$$D_{\mathbf{u}}f(0, 8) =$$



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✓

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SCalcET7 14.6.007.

Consider the following equation.

$$f(x, y) = \sin(5x + 3y), \quad P(-6, 10), \quad \mathbf{u} = \frac{1}{2}(\sqrt{3}\mathbf{i} - \mathbf{j})$$

(a) Find the gradient of f .

$$\nabla f(x, y) =$$



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(b) Evaluate the gradient at the point P .

$$\nabla f(-6, 10) =$$



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(c) Find the rate of change of f at P in the direction of the vector \mathbf{u} .

$$D_{\mathbf{u}}f(-6, 10) =$$



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SCalcET7 14.6.008.

Consider the following equation.

$$f(x, y) = y^3/x, \quad P(1, 3), \quad \mathbf{u} = \frac{1}{3}(2\mathbf{i} + \sqrt{5}\mathbf{j})$$

(a) Find the gradient of f .

$$\nabla f(x, y) =$$



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(b) Evaluate the gradient at the point P .

$$\nabla f(1, 3) =$$



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(c) Find the rate of change of f at P in the direction of the vector \mathbf{u} .

$$D_{\mathbf{u}}f(1, 3) =$$



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SCalcET7 14.6.011.

Find the directional derivative of the function at the given point in the direction of the vector \mathbf{v} .

$$f(x, y) = 7e^x \sin y, \quad (0, \pi/3), \quad \mathbf{v} = \langle -5, 12 \rangle$$

$$D_{\mathbf{u}}f(0, \pi/3) =$$



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SCalcET7 14.6.014.

Find the directional derivative of the function at the given point in the direction of the vector \mathbf{v} .

$$g(r, s) = \tan^{-1}(rs), \quad (2, 1), \quad \mathbf{v} = 5\mathbf{i} + 10\mathbf{j}$$

$$D_{\mathbf{u}}g(2, 1) =$$



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SCalcET7 14.6.015.

Find the directional derivative of the function at the given point in the direction of the vector \mathbf{v} .

$$f(x, y, z) = xe^y + ye^z + ze^x, \quad (0, 0, 0), \quad \mathbf{v} = \langle 6, 3, -2 \rangle$$

$$D_{\mathbf{u}}f(0, 0, 0) =$$



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