

Student: Jonathan Yee
Submitted: 02/11/16 10:12am

Instructor: Yousry Elsabrouty
Course: MATH 277 All Lectures - Winter 2016
Book: Adams/Essex: Calculus: A Complete Course, Eighth Edition

Assignment: Assignment # 2

1. A frictionless highway turn is circular with radius 34 metres is banked at an angle of 10° . What will be the maximum posted speed for the turn to the **nearest** km/h?
You may assume the gravitational acceleration is equal to 9.8 m/s^2 .

Maximum Posted Speed $v = 28$ km/h

YOU ANSWERED: nothing

2. A frictionless road turn is circular of radius 70 metres is designed to have a maximum speed of 54 km/h. What is the banking angle of the turn to the **nearest** degree?
You may assume the gravitational acceleration is equal to 9.8 m/s^2 .

Banking Angle $\theta = 18$ Degrees.

YOU ANSWERED: nothing

3. Find the domain of the function $f(x,y) = \frac{1}{49 - 343^{(9x - 19y - 58)}}$

Domain $D = \{(x,y) : 27x - 57y - 176 \neq 0\}$

Express answer in the form $ax + by + c$, where $a > 0$, b and c are integers.

YOU ANSWERED: nothing

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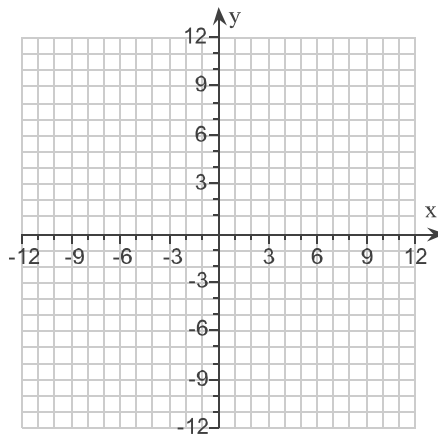
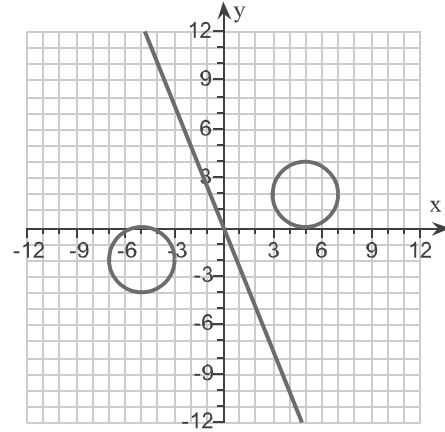
4.

Let $f(x,y) = \frac{-5x - 2y}{2x^2 + 2y^2 + 50}$. Sketch the level

curves $f(x,y) = c$ for $c = -\frac{1}{4}$, $c = 0$, and

$c = \frac{1}{4}$ on the same set of coordinate axes.

Use the graphing tool to graph the level curves.



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5.

For the function $f(x,y) = \sin^2(2x - 8y)$, find $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$.

$$\frac{\partial f}{\partial x} = 4 \sin(2x - 8y) \cos(2x - 8y)$$

(Simplify your answer.)

$$\frac{\partial f}{\partial y} = -16 \sin(2x - 8y) \cos(2x - 8y)$$

(Simplify your answer.)

YOU ANSWERED: nothing
nothing

6.

For what values of the constants A and B is the polynomial function

$f(x, y) = Ax^5 - 50x^3y^2 + Bxy^4$ harmonic in the whole xy -plane?

$f(x, y) = Ax^5 - 50x^3y^2 + Bxy^4$ is harmonic in the xy -plane if

$A = 5$ and $B = 25$.

YOU ANSWERED: nothing
nothing

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7. Let $z = f(x, y) = (9 + 14x)y^{\tan(x)}$, where :

$$x = \left(\frac{12 - e}{2e} \right)(t - 1) + \tan^{-1}(t), \text{ and } y = (2 - t)e^t - 12(t - 1).$$

Use the chain rule to find $\frac{dz}{dt}$ at $t = 1$.

$$\frac{dz}{dt} = 84$$

Type an integer or a fully reduced fraction.

YOU ANSWERED: nothing

8. Let $z = 40x^2 + 120xy - 3y^2$, where $x(t, s) = \cosh(5t) \cos(4s)$ and

$$y(t, s) = \sinh(5t) \sin(4s).$$

(i) Use the chain rule to compute $\frac{\partial z}{\partial t}$ at $(t, s) = \left(\frac{1}{10} \ln(5), \frac{\pi}{4} \right)$

(ii) Use the Chain rule to compute $\frac{\partial z}{\partial s}$ at $(t, s) = \left(\frac{1}{10} \ln(5), \frac{\pi}{4} \right)$

$$(i) \frac{\partial z}{\partial t} = 480$$

$$(ii) \frac{\partial z}{\partial s} = 576$$

Exact values Required. No Radicals permitted.

Use Only Integers Or Fully Reduced Fractions.

YOU ANSWERED: nothing

nothing

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9. Find an equation of the plane tangent to the surface $2x^2 + y^2 - 12z = 0$ and parallel to the plane $4x + 10y + 3z + 73 = 0$.

The equation of the plane is given by $z = -\frac{4}{3}x - \frac{10}{3}y - 36$.

YOU ANSWERED: nothing

10. Find the linearizations $L(x,y,z)$ of the function $f(x,y,z) = 4xy + 5yz + xz$ at $(1,1,1)$, $(1,0,0)$.

The linearization of $f(x,y,z)$ at $(1,1,1)$ is $L(x,y,z) = 5x + 9y + 6z - 10$.

The linearization of $f(x,y,z)$ at $(1,0,0)$ is $L(x,y,z) = 4y + z$.

YOU ANSWERED: nothing

nothing