Compute the indicated function value:

$$f(x,y) = \frac{-9x+3y}{-9x+7y}; \quad f(-1,-2).$$

(Round your answer to 3 decimal places).

Tries 0/3

Compute the indicated function value:

$$f(x,y) = \frac{x^2-12}{\ln(2y)\sqrt{10-x}}; \quad f\left(3, \frac{e^6}{2}\right).$$

(Round your answer to 4 decimal places).

Tries 0/3

Find the domain of the following function of two variables:

$$f(x,y) = \frac{-15e^{xy}}{20-e^{xy}}.$$

NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x,y) : e^{xy} \neq 20\}$
B. $\{(x,y) : e^{xy} < 20\}$
C. $\{(x,y) : e^{xy} \leq 20\}$
D. $\{(x,y) : e^{xy} \geq 20\}$
E. $\{(x,y) : e^{xy} > 20\}$
F. $\{(x,y) : e^{xy} = 20\}$

Tries 0/2

Find the domain of the following function of two variables:

$$f(x,y) = \frac{12x}{\ln(2x+12y)}.$$

NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x,y) : 2x+12y > 0, 2x+12y \neq 1\}$
B. $\{(x,y) : 2x+12y > 0, 12x \neq 1\}$
C. $\{(x,y) : 2x+12y < 0, 2x+12y \neq 1\}$
D. $\{(x,y) : 2x+12y > 0, 2x+12y \leq 1\}$

E. $\{(x, y) : 2x + 12y < 0, 12x \neq 1\}$

Tries 0/2

What do the level curves for

$$f(x, y) = 4\sqrt{y + 3x^2}$$

look like?
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. Hyperbolas
B. Lines
C. Circles
D. Parabolas
E. Point at the origin

Tries 0/2

The domain of the function

$$f(x, y) = \frac{4x}{\sqrt{4x - 3y - 13}}$$

is all ordered pairs (x, y) of real numbers such that:
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x, y) \mid 4x - 3y < 13\}$
B. $\{(x, y) \mid 4x - 3y \neq 13\}$
C. $\{(x, y) \mid 4x - 3y \geq 13\}$
D. $\{(x, y) \mid 4x - 3y > 13\}$
E. $\{(x, y) \mid x, y \text{ any real numbers}\}$

Tries 0/2

A chain of paint store carries two brands of latex paint. Sales figures indicate that if the first brand it sold for x dollars per gallon and the second for y dollars per gallon, the demand for the first brand will be

$$D_1(x, y) = 300 - 10x + 70y \quad \text{gallons per month}$$

and the demand for the second brand will be

$$D_2(x, y) = 300 + 70x - 20y \quad \text{gallons per month.}$$

(a) Express the chain of paint store's monthly revenue from the sale of paint as a function of x and y.
$R(x, y) =$ [ ]

Tries 0/3

(b) Compute the revenue from part (a) if the first brand it sold for \$24 per gallon and the second for \$25 per gallon.

$ [ ]
Tries 0/3

Find the domain of the following function of two variables.

$$\sqrt{4-x^2}+\sqrt{y^2-4}$$

NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x,y) \mid |x| \leq 2 \text{ and } |y| \leq 2\}$
B. $\{(x,y) \mid |x| \geq 2 \text{ and } |y| \leq 2\}$
C. $\{(x,y) \mid |x| < 2 \text{ and } |y| < 2\}$
D. $\{(x,y) \mid |x| \leq 2 \text{ and } |y| \geq 2\}$
E. $\{(x,y) \mid |x| > 2 \text{ and } |y| \geq 2\}$

Tries 0/2

The domain of

$$f(x,y)=\frac{\sqrt{x-4}}{\ln(y-4)-7}$$

is the set of all ordered pairs (x,y) of real numbers such that:
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x,y) \mid x > 4, y \geq 4\}$
B. $\{(x,y) \mid x \geq 4, y > 4, y \neq e^7+4\}$
C. $\{(x,y) \mid x > 4, y > 4, y \neq e^7+4\}$
D. $\{(x,y) \mid x \geq 4, y \geq 4\}$
E. $\{(x,y) \mid x \geq 4, y \geq 4, y \neq e^7+4\}$

Tries 0/2

Describe the sketch of the level curves of the function for the given values of z:

$$f(x,y)=9x^2y, \quad z=-4,\ 5.$$

(a) What type of function describes the level curves?
NOTE: ONLY 2 ANSWER TRIES ON Part (a).

A. Increasing exponential functions
B. Rational Functions with x-axis symmetry
C. Natural logarithm functions
D. Decreasing exponential functions
E. Rational Functions with y-axis symmetry

Tries 0/3

(b) What functions $y = f(x)$ do you get for these values of z?
(Enter the expression for the negative function in the first answer box, and the expression for the positive function in second answer box).
$y =$ [ ] [ ]

Tries 0/3

(c) What is the vertical asymptote for both functions?
$x =$ [ ]

Tries 0/3

(d) What is the horizontal asymptote of both functions?
$y =$ [ ]

Tries 0/3

Describe the indicated level curves $f(x, y) = C$.

$$f(x, y) = \ln(x^2 + y^2); \quad C = 3, \ C = \ln 16.$$

NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. Ellipses with foci at $(3, \pm \ln 16)$
B. Parabolas with vertices at $(0, 0)$
C. Circles with centers at $(0, 0)$
D. Parabolas with vertices at $(3, \ln 16)$
E. Circles with centers at $(3, \ln 16)$
F. Ellipses with foci at $(\pm 3, \ln 16)$

Tries 0/2

The domain of the function

$$f(x, y) = \frac{\ln(10 - x - y)\sqrt{x + y - 1}}{\sqrt[4]{x + y - 3}}$$

is the set of all ordered pairs (x, y) of real numbers such that:
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. $\{(x, y) \mid 3 \leq x + y < 10\}$
B. $\{(x, y) \mid 3 < x + y < 10\}$
C. $\{(x, y) \mid 1 < x + y < 10\}$
D. $\{(x, y) \mid 3 < x + y \leq 10\}$
E. $\{(x, y) \mid 1 < x + y < 3, \}$

Tries 0/2

If

$$f(x,y) = 18\ln(4(x-13)^2 + 4(y-3)^2),$$

then the level curves of f are in the shape of
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. Circles
B. Logarithmic Curves
C. Exponential Curves
D. Lines
E. Parabolas

Tries 0/2

Sketch the graph of the level curves of the function for the given values of z:

$$f(x,y) = 3e^{-x} - y, \quad z = -8,\ 3.$$

(a) What type of functions are the level curves?
NOTE: ONLY 2 ANSWER TRIES ON THIS PROBLEM.

A. Rational Functions with x-axis symmetry
B. Rational Functions with symmetry about the origin
C. Decreasing exponential functions
D. Increasing exponential functions
E. Natural logarithm functions

Tries 0/3

(b) For what values of y do the level curves have a y-intercept for these values of z? (Put the smaller y-value first.)

Tries 0/3

(c) What are the y values of the asymptotes of the level curves for these values of z? (Put the smaller y-value first.)

Tries 0/3

Describe the level curve $f(x,y) = C$ for

$$C = 10 \text{ and } f(x,y) = \sqrt{3(x+7)^2 + 3(y+20)^2}.$$

Circle with radius ☐ and center
$(x, y) =$(☐ , ☐)
Tries 0/3

Find f_x and f_y where

$$f(x, y) = \sqrt{1 - 9x^2 - 3y^2}$$

.
$f_x =$ ☐
Tries 0/3
$f_y =$ ☐
Tries 0/3

Find f_x and f_y where

$$f(x, y) = 9x \tan(4y)$$

.
$f_x =$ ☐
Tries 0/3

(Round your answer to 3 decimal places.)
$f_x(-1, 5) =$ ☐
Tries 0/3

$f_y =$ ☐
Tries 0/3

(Round your answer to 3 decimal places.)
$f_y(-1, 5) =$ ☐
Tries 0/3

Compute $\frac{\partial z}{\partial x}$, where $z = 27 \ln(3xy + 2)$.
☐
Tries 0/3

Find f_x and f_y where

$$f(x, y) = e^{0.02x^2 + 0.03y^2}$$

$f_x =$ ☐
Tries 0/3

(Round your answer to 3 decimal places.)
$f_x(-7,6) =$ [ ]
Tries 0/3

$f_y =$ [ ]
Tries 0/3

(Round your answer to 3 decimal places.)
$f_y(-7,6) =$ [ ]
Tries 0/3

A pharmaceutical company has two production plants that produce the same medicine. If x and y are the number of units produced in each plant respectively, the total revenue for the product is given by

$$R(x,y) = 128x + 139y - 5x^2 - 4xy - 3y^2$$

dollars. When $x = 14, y = 13$, find the marginal revenue (the rate of change of the revenue with respect to the number of units) for both plants. $\partial R/\partial x =$ [ ]
Tries 0/3

$\partial R/\partial y =$ [ ]
Tries 0/3

Let

$$f(x,y) = \frac{3x^2y^3}{y - 4x};$$

evaluate $f_x(x,y)$ at $(1,-1)$.
(Round your answer to 4 decimal places)

[ ]
Tries 0/3

Compute $f_x(3,10)$. If $f(x,y) = \dfrac{(2x-4y)^2}{\sqrt{y-1}}$.
(Round your answer to 4 decimal places)

[ ]
Tries 0/3

For the function

$$z = \frac{4xy^2}{x^2y^3 + 3},$$

the first partial derivative $\frac{\partial z}{\partial y}$ is

Tries 0/3

Find f_x and f_y where $f(x, y) = 4e^{4(x+y)(xy)}$.

$f_x =$

Tries 0/3

$f_y =$

Tries 0/3

One's Intelligence Quotient IQ is determined by their Mental Age M, and their chronological age C. It is calculated using the formula

$$IQ = (M/C) \cdot 100$$

Find the rates of change of IQ with respect to both an individual's mental and chronological ages for a person who has a mental age of 13 years and a chronological age of 11 years. Round your answer to the nearest 3 decimal places.

Rate of change with respect to mental age =

Tries 0/3

Rate of change with respect to chronological age =

Tries 0/3

Find all first and second partial derivatives of

$$f(x, y) = 7x^3y^2 + 5y^5.$$

$f_x =$
$f_y =$

Tries 0/3

$f_{xx} =$
$f_{yy} =$
$f_{xy} =$

Tries 0/3

Compute f_{uv} for

$$f(u, v) = 7uv + 5e^{u+2v}.$$

Tries 0/3

Given

$$f(x,y) = 7x\,e^{5yx^2},$$

find the mixed partial $f_{xy}(x,y)$.

Tries 0/3

For the function

$$f(u,v) = 8u\ln(5uv) + 8u^2,$$

the second partial $f_{uu}(u,v)$ is

Tries 0/3

Find the second partial derivatives of

$$f(x,y) = 8x\sin(3y).$$

and evaluate each at $(x,y) = (12,7)$.
(Round numerical answers to 5 decimal places.)

$f_{xx} =$

Tries 0/3

$f_{xx}(12,7) =$

Tries 0/3

$f_{xy} =$

Tries 0/3

$f_{xy}(12,7) =$

Tries 0/3

$f_{yy} =$

Tries 0/3

$f_{yy}(12,7) =$

Tries 0/3

For

$$f(x,y) = \frac{13y\,\ln x}{2y^3 - 1},$$

find $f_{xy}(1,2)$.
(Round your answer to 4 decimal places).

Tries 0/3

Find the second partial derivatives for the given function.

$$f(x,y) = \frac{x\ln(10xy)}{y}$$

$f_{xx} =$

Tries 0/3

$f_{yy} =$

Tries 0/3

$f_{xy} =$

Tries 0/3

Find $f_{xy}(x,y)$ if

$$f(x,y) = (3x^3 + 4y^2)e^{-xy}$$

Tries 0/3

Compute the second order partial derivatives of

$$f(x,y) = ln(3x^2 + 5y)$$

$f_{xx} =$

Tries 0/3

$f_{yy} =$

Tries 0/3

$f_{xy} =$

Tries 0/3

Compute the second order partial derivatives of

$$f(x,y) = 3y \cdot e^{\cos(5x-3)}$$

$f_{xx} =$

Tries 0/3

$f_{yy} =$ ☐
Tries 0/3

$f_{xy} =$ ☐
Tries 0/3

Use increments to estimate the change in z at $(5, 7)$ if

$$\frac{\partial z}{\partial x} = -9x - 9 \text{ and } \frac{\partial z}{\partial y} = 3y + 8,$$

the change in x is 0.3 and the change in y is 0.5.
(Round your answer to the nearest tenth).
☐
Tries 0/3

Find a function $z = f(x, y)$ and then use the total differential to approximate the quantity to 3 decimal places.

$$\sqrt{(4.25)^2 + (5.8)^2} - \sqrt{4^2 + 5^2}$$

☐
Tries 0/3

The output at a certain plant is $Q(x, y) = 0.08x^2 + 0.12xy + 0.03y^2$ units per day, where x is the number of hours of skilled labor used and y is the number of hours of unskilled labor used. Currently, 40 hours of skilled labor and 140 hours of unskilled labor are used each day. Use calculus to estimate to one decimal place the change in daily output if an additional 4.5 hours of skilled labor are used each day, while 4.5 fewer hours of unskilled labor are used each day.

Choices: **Increase**, **Decrease**.

- by

☐ units per day
Tries 0/3

The pressure of an ideal gas, measured in kPa, is related to its volume, V, and temperature, T, by the equation:

$$PV = 0.31T.$$

The temperature is measured with an error of 7 Kelvin and the volume is measured with an error of 0.4m^3. If it is know that the actual values are $T = 236$ Kelvin and $V = 3\text{m}^3$, what is the estimated maximum error in the measurement of the pressure? Round your answer to 4 decimal places.
$\pm$ ☐ kPa
Tries 0/3

A soft drink can is a cylinder h cm tall with radius r cm. Its volume is given by the formula $V(r,h) = \pi r^2 h$. A particular can is 10 cm tall and has a radius of 3 cm. If the height is increased by 1 cm, use calculus to estimate the change in the radius needed so that the volume stays the same. Round your answer to 4 decimal places.

Choices: **Increase**, **Decrease**.

- by

[ ] cm

Tries 0/3

The productivity of a company is

$P(x,y) = 30x^{4/5}y^{1/5}$ thousands of units. Where x is the number of employees and y is the amount of capital expenditures in thousands of dollars. What is the change in the productivity if the number of employees is decreased from 195 to 170 and the amount of capital spent is increased from \$21000 to \$28000?

(Please round to 2 decimal places.)

Choices: **Increase**, **Decrease**.

- by

[ ] thousands of units.

Tries 0/3

Hot chocolate sales (in gallons) are predicted by

$$f(x,y) = \frac{1.4\sqrt{x}}{y}$$

where y is the temperature (in $^\circ C$) and x is the amount of snow on the ground (in inches). If the temperature rises from 1.3° to 1.6° and the amount of snow falls from 3 inches to 2.6 inches, use differentials to estimate the change in hot chocolate sales. Round your answers to 3 decimals.

The change in hot chocolate sales due to the change in the amount of snow is:

Choices: **Increase**, **Decrease**, **No Change**.

- by

[ ] gallons

Tries 0/3

The change in the hot chocolate sales due the change in the temperature is:

Choices: **Increase**, **Decrease**, **No Change**.

- by

[ ] gallons

Tries 0/3

The total change in the hot chocolate sales is:

Choices: **Increase**, **Decrease**, **No Change**.

- by

[ ] gallons

Tries 0/3

Arthur, a mathematician, has observed that he writes

$$P(x, y) = \sqrt{xy^2 + 70} + 25 \quad \text{pages per month}$$

when he drinks x cups of coffee and y cups of tea during that month. Regularly, he drinks 50 cups of coffee and 40 cups of tea per month, but he plans to drink 35 cups of coffee and 60 cups of tea in the next month. Use calculus to estimate how many more pages he will write in the next month. Round your answers to the nearest integer.

The change in how many pages Arthur writes due to the change in cups of coffee he drinks is: [ ]

Tries 0/3

The change in how many pages Arthur writes due to the change in cups of tea he drinks is: [ ]

Tries 0/3

The total change in how many pages Arthur writes is: [ ]

Tries 0/3

A soft drink can is h centimeters tall and has a radius of r cm. The cost of material in the can is 0.0015 cents per cm^2 and the soda itself costs 0.001 cents per cm^3. The cans are currently 4 cm tall and have a radius of 4 cm. Use calculus to estimate the effect on costs of increasing the radius by 0.4 cm and decreasing the height by 0.9 cm. Round your answer to 3 decimals.

[ ] cents per can

Tries 0/3

The specific gravity of an object with density greater than that of water can be determined by using the formula

$$S = \frac{A}{A - W}$$

where A and W are the weights of the object in air and water, respectively. If the measurements of an object are $A = 2.9$ pounds and $W = 1.8$ pounds with maximum errors of 0.06 pounds and 0.09 pounds, respectively, find the approximate relative percentage error in calculating S. Round to 2 decimal places.

[ ] %

Tries 0/3

Use the chain rule to compute dz/dt for

$$z = x^2 y, \quad x = \sin(9t), \quad y = 5t^2 + 1.$$

ANSWER NOTES: Your answer should definitely have x, y, and t in it. You should NOT substitute ANY expressions with t in for x and y, NOR replace ANY expressions containing t with x or y.

$dz/dt =$ [ ]

Tries 0/3

Use the chain rule to compute $\frac{dz}{dt}$ for

$$z = \sin(x^2 + y^2), \quad x = 10t^2 + 3, \quad y = 6t^3.$$

ANSWER NOTES: Your answer should definitely have x, y, and t in it. You should NOT substitute ANY expressions with t in for x and y, NOR replace ANY expressions containing t with x or y.

$\frac{dz}{dt} =$ [ ]

Tries 0/3

The daily revenue from sales of a new phone is given by

$$R(x, y) = 10 + 15x^{3/2}y^{7/3}$$

where x dollars are spent daily on advertising and y dollars are spent daily on employee wages. It is determined that, t days from now,

$$x = t^2 + t - 5$$
$$y = \sqrt{t} - 1.$$

At what rate (in dollars per day) will the daily revenue be changing 4 days from now? (Round your answer to 3 decimal points)

[ ]

Tries 0/3

Use the chain rule to compute $\frac{dz}{dt}$ for

$$z = x \sin(4y), \quad x = e^{1.25t}, \quad y = \pi - 8t.$$

Then evaluate at t=0.6

(Round your answer to 4 decimal places.)

$\frac{dz}{dt} =$ [ ]

Tries 0/3

Suppose $z = 4xy$, where $x = e^{-5t}$ and $y = \ln(\sqrt{t})$. Use the chain rule to find $\frac{dz}{dt}$. Express your answer in terms of x, y and t.

ANSWER NOTES: Your answer should definitely have x, y, and t in it. You should NOT substitute ANY expressions with t in for x and y, NOR replace ANY expressions containing t with x or y.

$\frac{dz}{dt} =$ [ ]

Tries 0/3

The radius of a right circular cylinder is increasing at a rate of 8 inches per minute and the height is decreasing at a rate of 17 inches per minute. What is the rate of change of the surface area when the radius is 14.5 inches and the height is 28.5 inches?

(Please round your answers to 3 decimal places.)

[ ] square inches per minute.

Tries 0/3

At a certain factory, when the capital expenditure is K thousand dollars and L worker-hours of labor are employed, the daily output will be $Q(K, L) = 130K^{1/2}L^{1/3}$ units. Currently, capital expenditure is $\$330,000$ and is increasing at the rate of $\$9,000$ per day, while 1,400 worker-hours are being employed and labor is being decreased at the rate of 4 worker- hours per day. Is the production increasing or decreasing? At what rate is production currently changing? (Round your answer to the nearest integer.)

Choices: **Increasing**, **Decreasing**.

- at

[ ] units per day

Tries 0/3

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

$$z = \frac{5x}{y}; \quad x = 9e^{-3t}; \quad y(t) = 6t^2.$$

$\frac{dz}{dt} =$ [ ]

Tries 0/3

The monthly demand for the Instant Pie Maker is given by

$$D(x,y) = \frac{3}{500} x e^{\frac{xy}{1000}} \text{ units,}$$

where x dollars are spent on infomercials and y dollars are spent on in-person demonstrations. If t months from now $x = 50 + t^{2/3}$ dollars are spent on infomercials and $y = t\ln(1+t)$ dollars are spent on demonstrations, at approximately what rate will the demand be changing with respect to time 8 months from now?
(Round your answer to 3 decimal places).

Tries 0/3

Chemistry students will recognize the ideal gas law, given by $PV = nRT$ which relates Pressure (in Pascals), Volume (in Liters), and Temperature (in degrees Kelvin) of n moles of gas where R is the ideal gas constant. Thus, we can view pressure (in Pa), volume (in L), and temperature (in K) as variables, each one dependent on the other two.
a. If pressure of a gas is increasing at a rate of $0.8\,Pa/\text{min}$ and temperature is increasing at a rate of $0.9\,K/\text{min}$, how fast is the volume changing?
V'=

Tries 0/3

b. If the volume of a gas is decreasing at a rate of $1.7\,L/\text{min}$ and temperature is increasing at a rate of $0.7\,K/\text{min}$, how fast is the pressure changing?
P'=

Tries 0/3

Find all local maximum and minimum points of

$$f(x,y) = -16 + 6x - 3y - \frac{7x^2}{2} - \frac{3y^2}{2}.$$

(If an answer does not exist, enter "None" in both response boxes.)
Local max at (,)

Tries 0/3

Local min at (,)

Tries 0/3

Find all local maximum and minimum points of

$$f(x,y) = \frac{7x^2}{2} + \frac{3y^2}{2} - 6x + 3y - 16.$$

(If an answer does not exist, enter "None" in both response boxes).
Local max at (,)

Tries 0/3

Local min at ([ ] , [ ])

Tries 0/3

Find all local maximum and minimum points of

$$f(x,y) = 3x^2 - xy + 9y^2 - 30x + 219y - 11.$$

(If an answer does not exist, enter "None" in both response boxes.)
Local max at ([ ] , [ ])

Tries 0/3

Local min at ([ ] , [ ])

Tries 0/3

Let the function

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

whose first order partial derivatives are

$$g_x = x + y \qquad \text{and} \qquad g_y = x + 4y^3.$$

Determine the critical points and show how many of these points are relative maxima, relative minima, and saddle points. (Answer from the smallest x-values to the largest).
$(x,y) = ($ [ ] , [ ] $)$,
$(x,y) = ($ [ ] , [ ] $)$,
$(x,y) = ($ [ ] , [ ] $)$

Tries 0/3

NOTE: ONLY 3 ANSWER TRIES ON THE SECOND PART OF THIS PROBLEM BELOW.

Choices: **0**, **1**, **2**, **3**.

- relative minima
- saddle point
- relative maxima
- inconclusive

Tries 0/3

Find the number relative maxima, relative minima, and saddle points of $f(x,y)$ if they exist.

$$f(x,y) = x^3 - 2xy - y^2 - 2x + 8.$$

NOTE: ONLY 3 ANSWER TRIES ON THIS PROBLEM.

Choices: **0**, **1**, **2**, **3**.

- saddle point
- relative maxima
- relative minima

Tries 0/3

Let the function

$$g(x,y) = x^2 - 5xy^2 + \frac{175}{8}y^4 + \frac{45}{2}y^2 - 3,$$

whose first order partial derivatives are

$$g_x = 2x - 5y^2 \qquad \text{and} \qquad g_y = -10xy + \frac{175}{2}y^3 + 45y.$$

Determine the number of critical points and classify them.
NOTE: ONLY 3 ANSWER TRIES ON THIS PROBLEM.

Choices: **0**, **1**, **2**, **3**, **4**.

- saddle point
- relative maxima
- inconclusive
- relative minima

Tries 0/3

Find and classify the critical points of the function

$$g(u,v) = 4u^2v - 96uv - 6v^2$$

(answer from the smallest u-values to the largest.)
$(u,v) =($ [ ] , [ ] $)$

Choices: **relative minimum**, **relative maximum**, **saddle point**, **inconclusive**.

-

Tries 0/3

$(u,v) =($ [ ] , [ ] $)$

Choices: **relative minimum**, **relative maximum**, **saddle point**, **inconclusive**.

-

Tries 0/3

$(u,v) =($ [ ] , [ ] $)$

Choices: **relative minimum**, **relative maximum**, **saddle point**, **inconclusive**.

-

Tries 0/3

Find and classify the critical points of the function

$$f(x,y) = -16x^4 - 27x + 12y^3 - 25y - 5$$

(Answer from the smaller y-value to the larger y-value and round your answers to 3 decimal places).
$(x,y) =($ [ ] , [ ] $)$

Choices: **relative minimum**, **relative maximum**, **saddle point**.

-

$(x,y) =($ [ ] , [ ] $)$

Choices: **relative minimum**, **relative maximum**, **saddle point**.

-

Tries 0/3

In a certain experiment to find out the ideal studying conditions in a library, the performance of the subject is influenced by two types of stimulus, noise and temperature, measured in positive units of x and y, respectively. Their performance is measured by the function

$$f(x,y) = -18 + 6xye^{4-6x^2-6y^2}.$$

How many units of each stimulus results in the maximum performance? (Round your answers to 4 decimal places).
$x =$ [ ] , $y =$ [ ]

Tries 0/3

The post office will accept packages whose combined length and girth is at most 34 inches. (The girth is the perimeter/distance around the package perpendicular to the length; for a rectangular box, the length is the largest of the three dimensions.) What is the largest volume that can be sent in a rectangular box? (Round answer to 2 decimal places.)
[ ] in^3

Tries 0/3

A shop sells two competing brands of socks, Levis and Gap. Each pair of socks is obtained at a cost of 6 dollars per pair. The manager estimates that if he sells the Levis socks for x dollars per pair and the Gap socks for y dollars per pair, then consumers will buy $26 - \frac{3}{2}x - y$ pairs of Levis socks and $1 + 3x - 3y$ pairs of Gap socks. How should the manager set the prices so that the profit will be maximized? Round your answers to the nearest cent.
$x =$ [ ] , $y =$ [ ]

Tries 0/3

Consider the function

$$f(x,y) = -15 + 3y + 3x^2y - 4x^2 - \frac{9}{4}y^2.$$

How many relative maxima, relative minima, and saddle points does $f(x,y)$ have?
NOTE: ONLY 3 ANSWER TRIES ON THIS PROBLEM.

Choices: **0**, **1**, **2**, **3**.

- relative minima
- relative maxima
- saddle point

Tries 0/3

We are tasked with constructing a rectangular box with a volume of 13 cubic feet. The material for the top costs 7 dollars per square foot, the material for the 4 sides costs 4 dollars per square foot, and the material for the bottom costs 8 dollars per square foot. To the nearest cent, what is the minimum cost for such a box?

$ _____

Tries 0/3

A manufacturer is planning to sell a new product at the price of 330 dollars per unit and estimates that if x thousand dollars is spent on development and y thousand dollars is spent on promotion, consumers will buy approximately $\frac{160y}{y+6} + \frac{180x}{x+3}$ units of the product.

If manufacturing costs for the product are 140 dollars per unit, how much should the manufacturer spend on development and how much on promotion to generate the largest possible profit?

Round your answer to the nearest dollar

Development costs: $ _____

Tries 0/3

Promotion costs: $ _____

Tries 0/3

A biologist must make a medium to grow a type of bacteria. The percentage of salt in the medium is given by $S = 0.01x^2y^2z$, where S is the percentage expressed as a decimal. And where x, y, and z are the amounts in liters of 3 different nutrients mixed together to create the medium. The ideal salt percentage for this type of bacteria is 23.7%. The costs of the x, y, and z nutrient solutions are respectively 5 , 7, and 6 dollars per liter. Determine the minimum cost that can be achieved.

(Round your answers to the nearest 4 decimal places.)

$ [ ]

Tries 0/3