← MAT2601_ONL8FA_ONL8F_21 - Calculus, Fall 2021

Week 4 Quiz MAT2601 (Homework)

INSTRUCTOR
Erin Cawley
SOUTH COLLEGE

Current Score

QUESTION	1	2	3	4	5	6	7	8	9	10
POINTS	–/10	–/10	–/10	–/10	–/10	–/10	–/10	–/10	–/10	–/10

TOTAL SCORE

–/100	0.0%

Due Date

TUE, OCT 26, 2021
11:59 PM EDT

Request Extension

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by questions. You are required to use a new randomization after every 3 question submissions.

Assignment Scoring

Your best submission for each question part is used for your score.

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1. **[-/10 Points]** DETAILS **HARMATHAP12 10.3.004.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

Find the absolute maxima and minima for $f(x)$ on the interval $[a, b]$.

$$f(x) = x^3 - 6x^2 - 15x + 5, \quad [-2, 6]$$

absolute minimum $(x, y) =$ ( ) ( )

absolute maximum $(x, y) =$ ( )

Need Help? Read It

2. **[–/10 Points]** DETAILS **HARMATHAP12 10.3.012.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

A company handles an apartment building with 70 units. Experience has shown that if the rent for each of the units is $1320 per month, all the units will be filled, but 1 unit will become vacant for each $20 increase in the monthly rate. What rent should be charged to maximize the total revenue from the building if the upper limit on the rent is $1420 per month?

$ [ ]

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3. **[–/10 Points]** DETAILS **HARMATHAP12 10.3.021.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

If the total cost function for a product is $C(x) = 200(0.02x + 6)^3$ dollars, where x represents the number of hundreds of units produced, producing how many units will minimize average cost?

$x =$ [ ] hundred units

Find the minimum average cost per hundred units.

$ [ ]

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4. **[-/10 Points]** DETAILS **HARMATHAP12 10.4.005.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

Analysis of daily output of a factory during a 8-hour shift shows that the hourly number of units y produced after t hours of production is

$$y = 102t + \frac{1}{2}t^2 - t^3, \quad 0 \le t \le 8.$$

(a) After how many hours will the hourly number of units be maximized?

[ ] hr

(b) What is the maximum hourly output?

[ ] units/hr

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5. **[-/10 Points]** DETAILS **HARMATHAP12 10.4.011.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

An inferior product with a large advertising budget sells well when it is introduced, but sales fall as people discontinue use of the product. Suppose that the weekly sales S are given by

$$S = \frac{900t}{(t+5)^2}, \quad t \ge 0$$

where S is in millions of dollars and t is in weeks. After how many weeks will sales be maximized?

[ ] weeks

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6. **[-/10 Points]** DETAILS **HARMATHAP12 10.4.017.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

A rectangular field with one side along a river is to be fenced. Suppose that no fence is needed along the river, the fence on the side opposite the river costs $40 per foot, and the fence on the other sides costs $10 per foot. If the field must contain 51,200 square feet, what dimensions will minimize costs?

side parallel to the river ____ ft

each of the other sides ____ ft

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7. **[-/10 Points]** DETAILS **HARMATHAP12 10.4.025.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

A company needs 450,000 items per year. It costs the company $2,160 to prepare a production run of these items and $17 to produce each item. If it also costs the company $1.50 per year for each item stored, find the number of items that should be produced in each run so that total costs of production and storage are minimized.

____ items/run

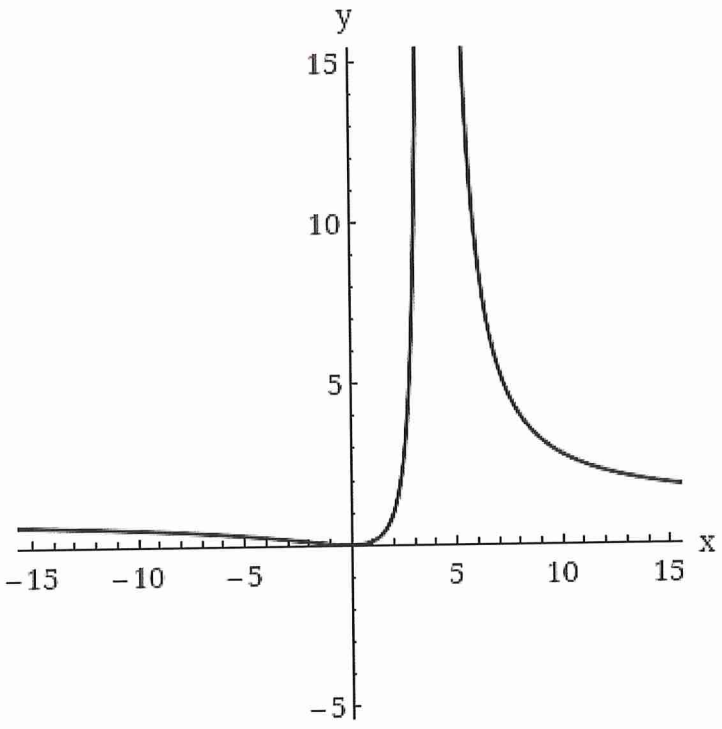
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8. [-/10 Points] DETAILS HARMATHAP12 10.5.004. 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

A function and its graph are given. Use the graph to find each of the following, if they exist. Then confirm your results analytically.

$$f(x) = \frac{x^2}{(x-4)^2}$$



(a) vertical asymptotes (Enter your answers as a comma-separated list of equations.)

(b) $\lim_{x \to \infty} f(x)$

(c) $\lim_{x \to -\infty} f(x)$

(d) horizontal asymptotes (Enter your answers as a comma-separated list of equations.)

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9. **[-/10 Points]** DETAILS **HARMATHAP12 10.5.013.** 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

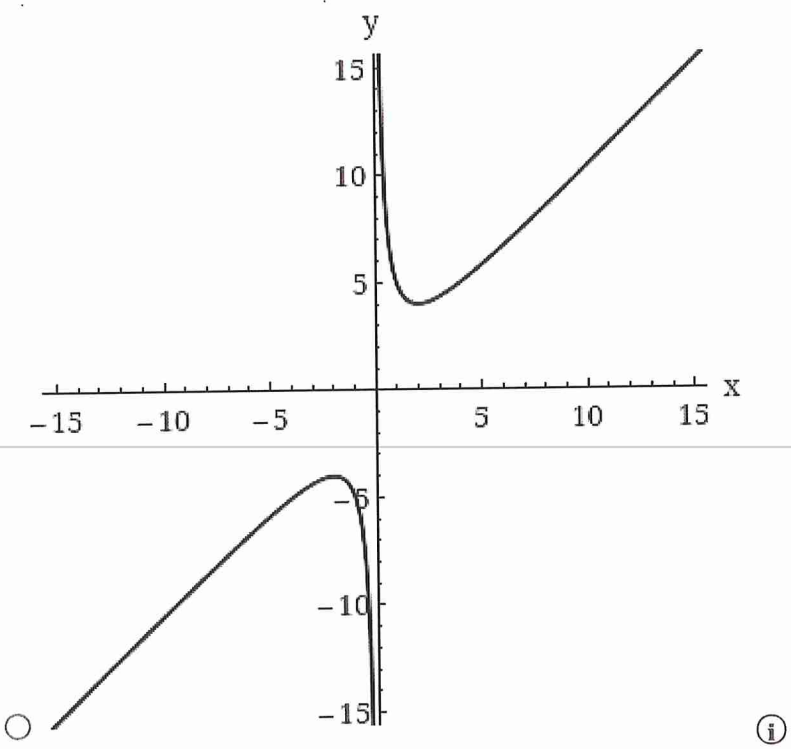
For the function, find any horizontal and vertical asymptotes. (Enter your answers as a comma-separated list of equations. If an answer does not exist, enter DNE.)

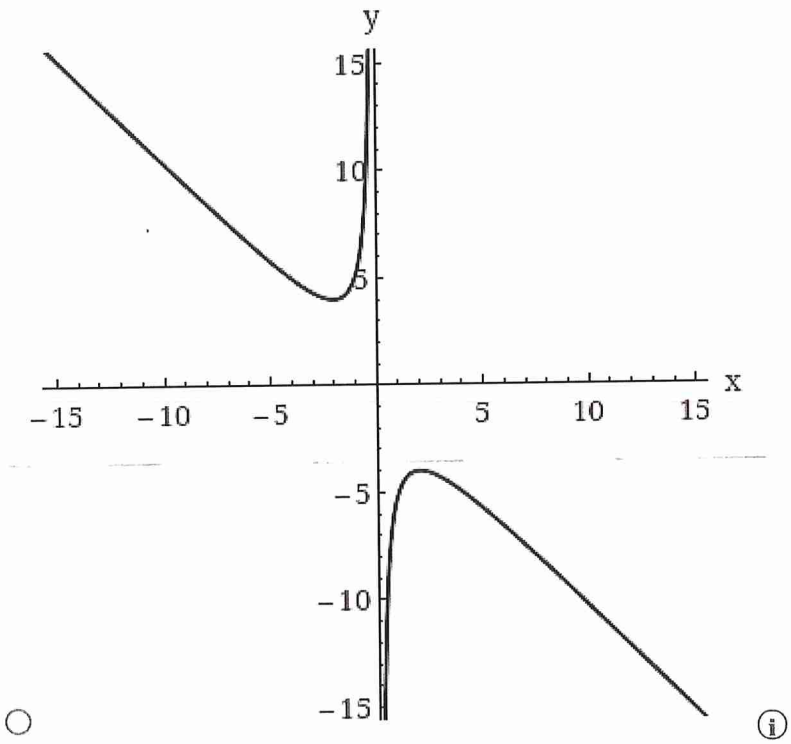
$$y = \frac{x^2 + 4}{x}$$

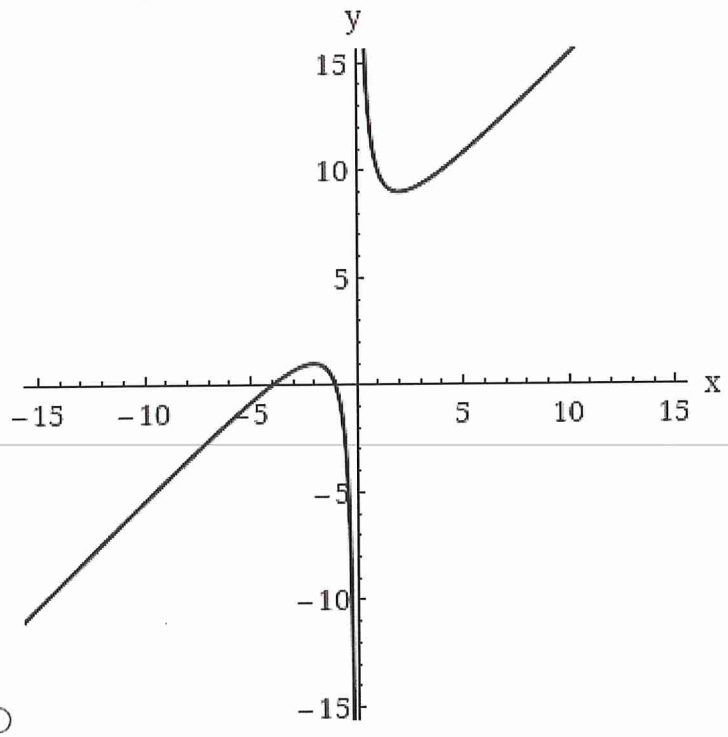
horizontal asymptotes

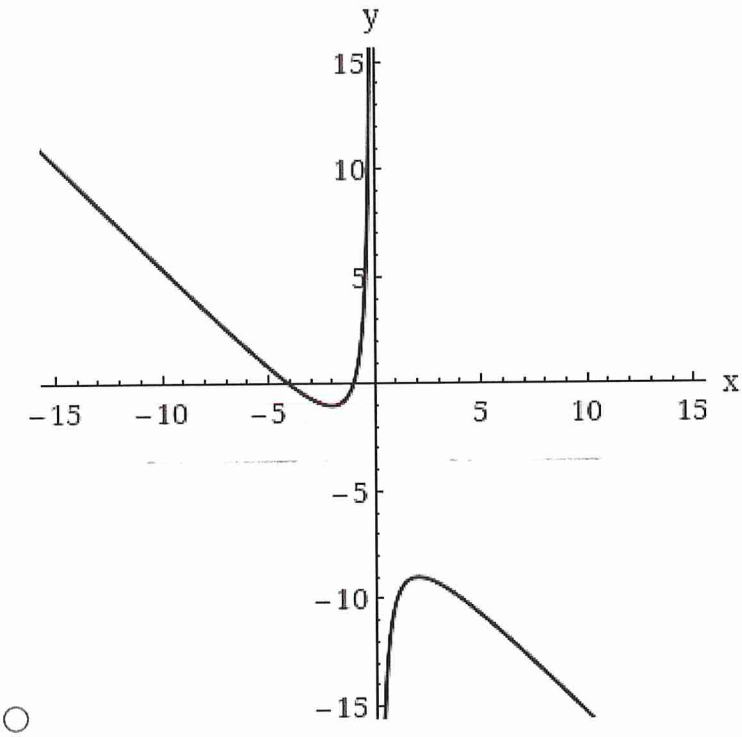
vertical asymptotes

Use information from the first derivative to sketch the graph.


y
15
10
5
x
−15
−10
−5
5
10
15
−5
−10
−15


y
15
10
5
x
−15
−10
−5
5
10
15
−5
−10
−15





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10. [-/10 Points] DETAILS HARMATHAP12 10.5.021. 0/15 Submissions Used

MY NOTES ASK YOUR TEACHER

A function and its first and second derivatives are given. Use these to find each of the following. (If an answer does not exist, enter DNE.)

$$y = x + \frac{3}{\sqrt[3]{x-4}}$$

$$y' = 1 - \frac{1}{(x-4)^{4/3}}$$

$$y'' = \frac{4}{3(x-4)^{7/3}}$$

Find any horizontal and vertical asymptotes. (Enter your answers as a comma-separated list of equations.)

horizontal asymptotes

vertical asymptotes

Find any critical points.

$(x, y) =$ (

) (smaller x-value)

$(x, y) =$ (

) (larger x-value)

Find any relative maxima and relative minima.

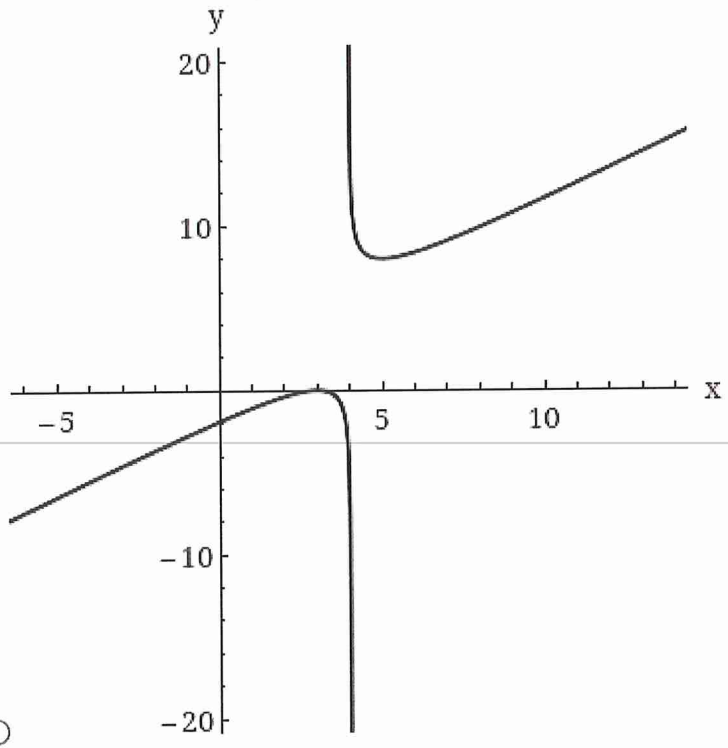
relative maximum $(x, y) = ($ $)$

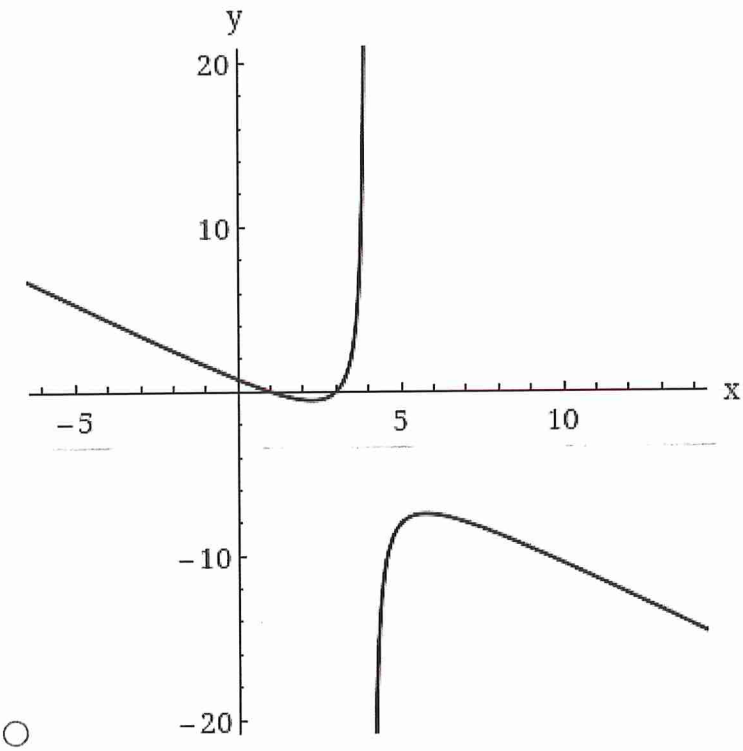
relative minimum $(x, y) = ($ $)$

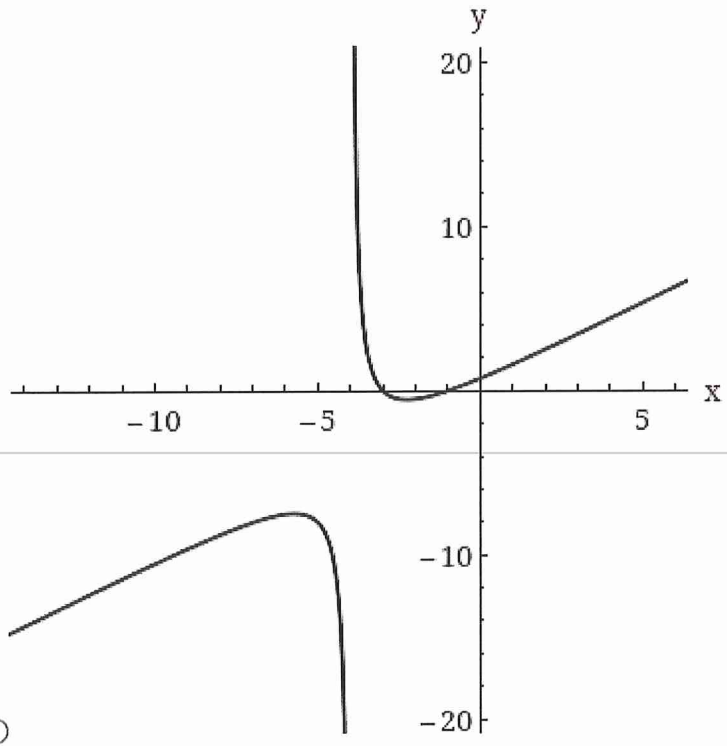
Find any points of inflection.

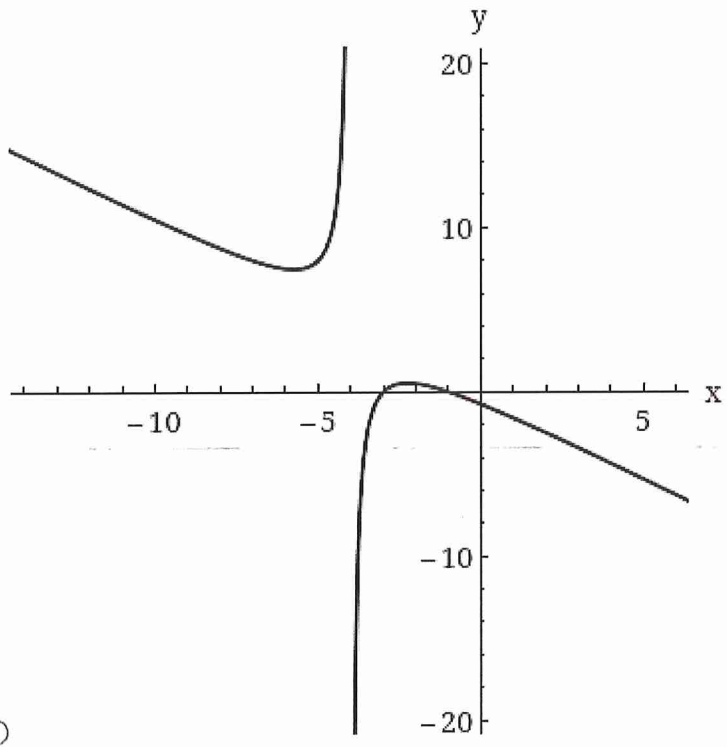
$(x, y) = ($ $)$

Sketch the graph of the function.


y
20
10
x
−5
5
10
−10
−20


y
20
10
x
−5
5
10
−10
−20





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