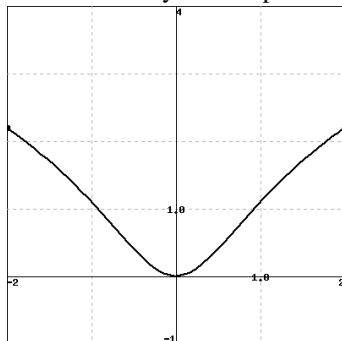


1. (1 pt) Use a graph below of $f(x) = \ln(2x^2 + 1)$ to estimate the x -values of any critical points and inflection points of $f(x)$.



critical points (enter as a comma-separated list): $x =$

inflection points (enter as a comma-separated list): $x =$

Next, use derivatives to find the x -values of any critical points and inflection points exactly.

critical points (enter as a comma-separated list): $x =$

inflection points (enter as a comma-separated list): $x =$

Answer(s) submitted:

•
•
•
•

(incorrect)

2. (1 pt) Find the inflection points of $f(x) = 4x^4 + 54x^3 - 42x^2 + 1$. (Give your answers as a comma separated list, e.g., 3,-2.)

inflection points = _____

Answer(s) submitted:

•

(incorrect)

3. (2 pts) The following table gives values of the differentiable function $y = f(x)$.

| | | | | | | | | | | | |
|-----|----|----|----|----|----|---|---|----|----|----|----|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| y | -3 | -4 | -5 | -7 | -6 | 2 | 1 | -1 | -3 | -1 | 1 |

Estimate the x -values of critical points of $f(x)$ on the interval $0 < x < 10$. Classify each critical point as a local maximum, local minimum, or neither.

(Enter your critical points as comma-separated x value,classification pairs. For example, if you found the critical points $x = -2$ and $x = 3$, and that the first was a local minimum and the second neither a minimum nor a maximum,

you should enter (-2,min), (3,neither). Enter none if there are no critical points.)

critical points and classifications: _____

Now assume that the table gives values of the continuous function $y = f'(x)$ (instead of $f(x)$). Estimate and classify critical points of the function $f(x)$.

critical points and classifications: _____

Answer(s) submitted:

•
•

(incorrect)

4. (2 pts) Find constants a and b in the function $f(x) = axe^{bx}$ such that $f(\frac{1}{3}) = 1$ and the function has a local maximum at $x = \frac{1}{3}$.

$a =$ _____

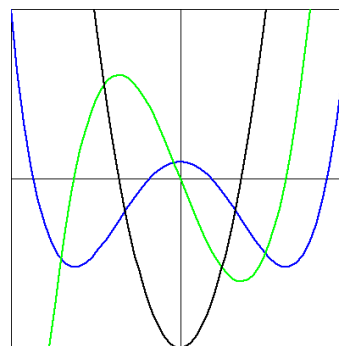
$b =$ _____

Answer(s) submitted:

•
•

(incorrect)

5. (1 pt) The following shows graphs of three functions, A (in black), B (in blue), and C (in green). If these are the graphs of three functions f , f' , and f'' , identify which is which.



(Click on the graph to get a larger version.)

(For each enter A, B or C).

$f =$ ____; $f' =$ ____; $f'' =$ ____

Answer(s) submitted:

•
•
•

(incorrect)

$$f(x) = \frac{3x^2}{x^2 + 25}.$$

(a) Calculate the first derivative of f . Find the critical numbers of f , where it is increasing and decreasing, and its local extrema.

$$f'(x) = \underline{\hspace{2cm}}$$

Critical numbers $x =$ _____

Increasing on the interval _____

Decreasing on the interval _____

Local maxima $x =$ _____

Local minima $x =$ _____

$$f''(x) = \underline{\hspace{2cm}}$$

Concave up on the interval _____

Concave down on the interval _____

Inflection points $x =$ _____

Horizontal asymptotes $y =$ _____

Vertical asymptotes $x =$ _____

(d) The function f is because for all x in the domain of f , and therefore its graph is symmetric about the .

Answer(s) submitted:

• • • • •

(incorrect)

Find A ____

and B _____

and C _____

 $(-\infty, A]: \underline{\hspace{2cm}}$

$[A, B):$ _____

 $(B, C]: \underline{\hspace{1.5cm}}$

$[C, \infty)$: _____

Answer(s) submitted:

•
•
•
•
•
•

(incorrect)