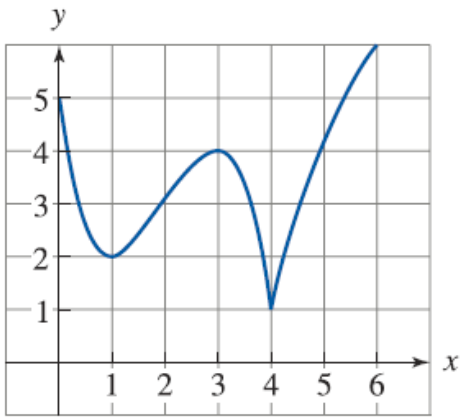
1. [–/1 Points] **DETAILS** SCALCET9 4.3.001.

Consider the following graph.



(a) Find the interval(s) on which f is increasing. (Enter your answer using interval notation.)

(b) Find the interval(s) on which f is decreasing. (Enter your answer using interval notation.)

(c) Find the open interval(s) on which f is concave upward. (Enter your answer using interval notation.)

(d) Find the interval(s) on which f is concave downward. (Enter your answer using interval notation.)

(e) Find the coordinates of the point(s) of inflection.

$(x, y) =$ (

)

Need Help? Watch It

2. [–/1 Points] DETAILS SCALCET9 4.3.003.

Suppose you are given a formula for a function f.

(a) How do you determine where f is increasing or decreasing?

If $f'(x)$? 0 on an interval, then f is increasing on that interval.

If $f'(x)$? 0 on an interval, then f is decreasing on that interval.

(b) How do you determine where the graph of f is concave upward or concave downward?

If $f''(x)$? 0 for all x in I, then the graph of f is concave upward on I.

If $f''(x)$? 0 for all x in I, then the graph of f is concave downward on I.

(c) How do you locate inflection points?

- At any value of x where the concavity changes, we have an inflection point at $(x, f(x))$.
- At any value of x where the concavity does not change, we have an inflection point at $(x, f(x))$.
- At any value of x where $f'(x) = 0$, we have an inflection point at $(x, f(x))$.
- At any value of x where the function changes from increasing to decreasing, we have an inflection point at $(x, f(x))$.
- At any value of x where the function changes from decreasing to increasing, we have an inflection point at $(x, f(x))$.

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3. [–/2 Points] **DETAILS** SCALCET9 4.XP.3.008.

Consider the equation below. (If an answer does not exist, enter DNE.)

$$f(x) = x^3 - 6x^2 - 15x + 4$$

(a) Find the interval(s) on which f is increasing. (Enter your answer using interval notation.)

Find the interval(s) on which f is decreasing. (Enter your answer using interval notation.)

(b) Find the local minimum and maximum values of f.

local minimum value

local maximum value

(c) Find the inflection point.

$(x, y) =$ (

)

Find the interval(s) on which f is concave up. (Enter your answer using interval notation.)

Find the interval(s) on which f is concave down. (Enter your answer using interval notation.)

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4. [–/2 Points] DETAILS SCALCET9 4.3.015.MI.SA.

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Consider the following.

$$f(x) = 4\sin(x) + 4\cos(x), \quad 0 \le x \le 2\pi$$

(a) Find the interval(s) on which f is increasing.

(b) Find the interval(s) on which f is decreasing.

(c) Find the local minimum and maximum values of f.

Click here to begin!

5. [–/2 Points] **DETAILS** SCALCET9 4.XP.3.014.

Consider the equation below. (If an answer does not exist, enter DNE.)

$$f(x) = e^{6x} + e^{-x}$$

(a) Find the interval on which f is increasing. (Enter your answer using interval notation.)

Find the interval on which f is decreasing. (Enter your answer using interval notation.)

(b) Find the local minimum and maximum values of f.

local minimum value

local maximum value

(c) Find the inflection point.

$(x, y) = ($)

Find the interval on which f is concave up. (Enter your answer using interval notation.)

Find the interval on which f is concave down. (Enter your answer using interval notation.)

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6. [–/1 Points] **DETAILS** SCALCET9 4.3.029.

Find the local maximum and local minimum values of f using both the First and Second Derivative Tests.

$$f(x) = 4 + 3x^2 - 2x^3$$

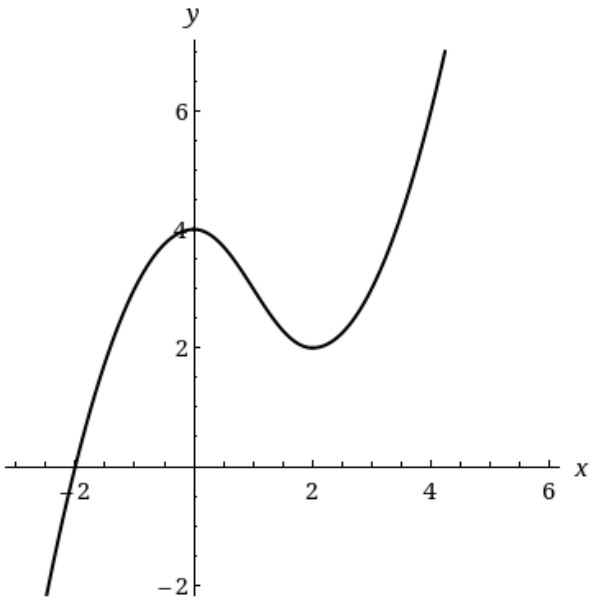
local maximum value

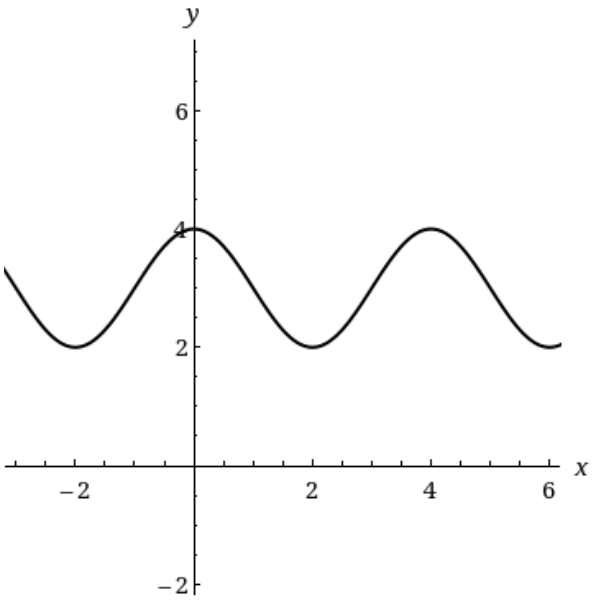
local minimum value

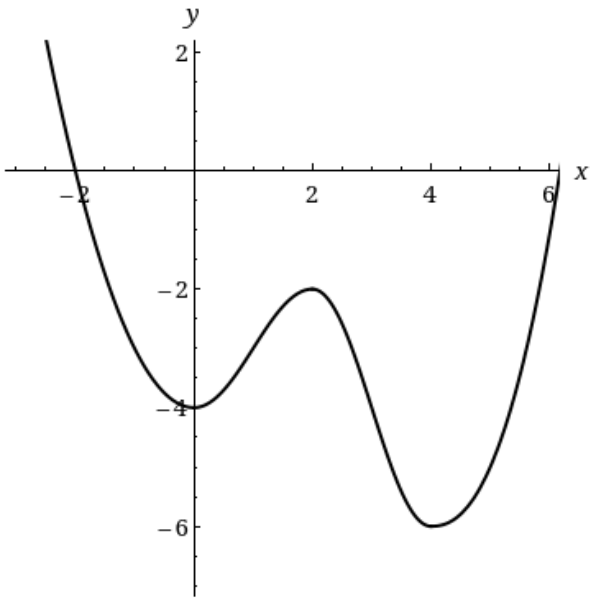
7. [–/1 Points] **DETAILS** SCALCET9 4.3.037.

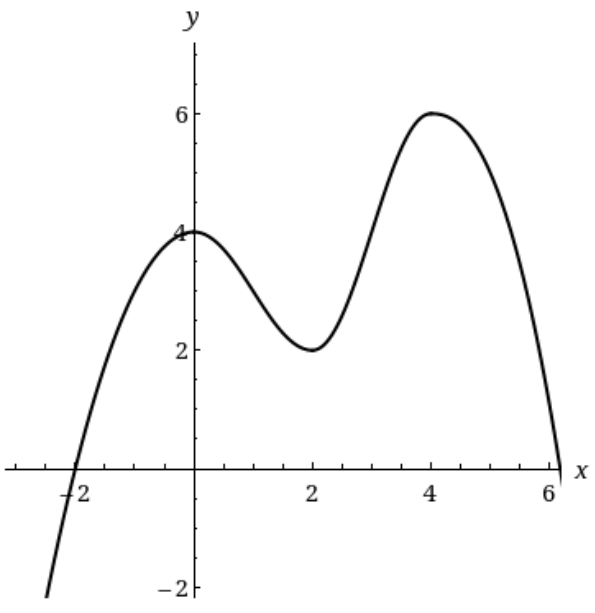
Sketch the graph of a function that satisfies all of the given conditions.

$f'(0) = f'(2) = f'(4) = 0$,
$f'(x) > 0$ if $x < 0$ or $2 < x < 4$,
$f'(x) < 0$ if $0 < x < 2$ or $x > 4$,
$f''(x) > 0$ if $1 < x < 3$,
$f''(x) < 0$ if $x < 1$ or $x > 3$









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8. [–/2 Points] DETAILS SCALCET9 4.3.048.MI.SA.

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Consider the following function.

$$g(x) = 160 + 8x^3 + x^4$$

(a) Find the intervals of increase and decrease.

(b) Find the local minimum and maximum values.

(c) Find the intervals where the graph is concave upward and downward, and find the inflection points.

(d) Use the information from parts (a)-(c) to sketch the graph.

Click here to begin!

9. [–/2 Points] **DETAILS** SCALCET9 4.3.057.

Consider the following. (If an answer does not exist, enter DNE.)

$$f(\theta) = 2\cos(\theta) + \cos^2(\theta), \quad 0 \le \theta \le 2\pi$$

(a) Find the interval(s) of increase. (Enter your answer using interval notation.)

Find the interval(s) of decrease. (Enter your answer using interval notation.)

(b) Find the local minimum value(s). (Enter your answers as a comma-separated list.)

Find the local maximum value(s). (Enter your answers as a comma-separated list.)

(c) Find the inflection points.

smaller x-value $(x, y) = ($

)

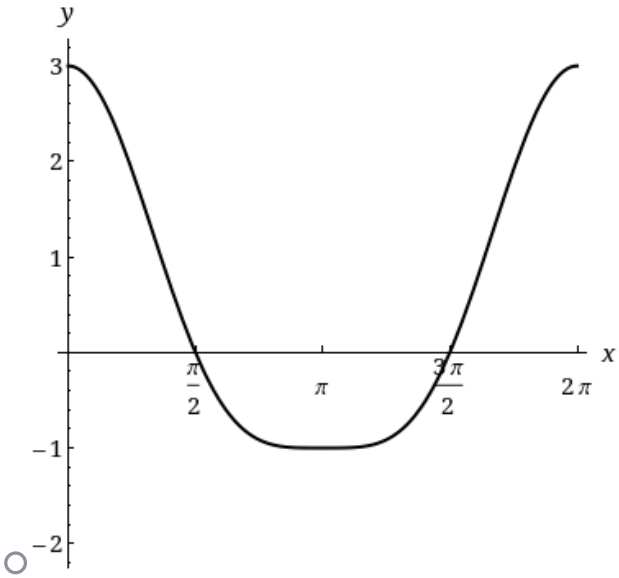
larger x-value $(x, y) = ($

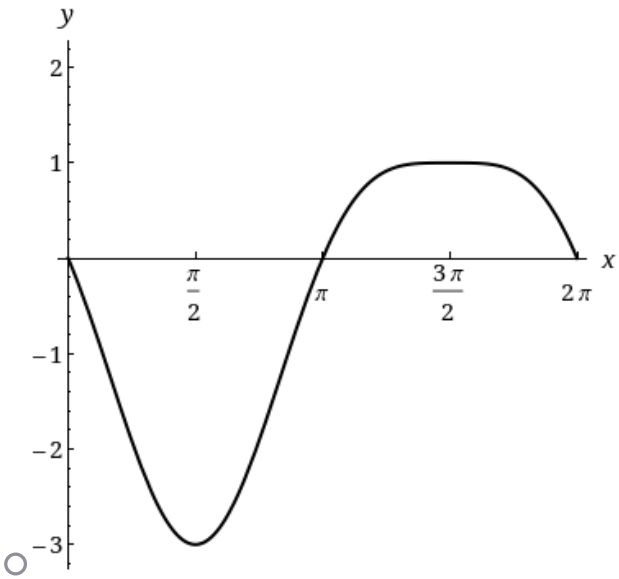
)

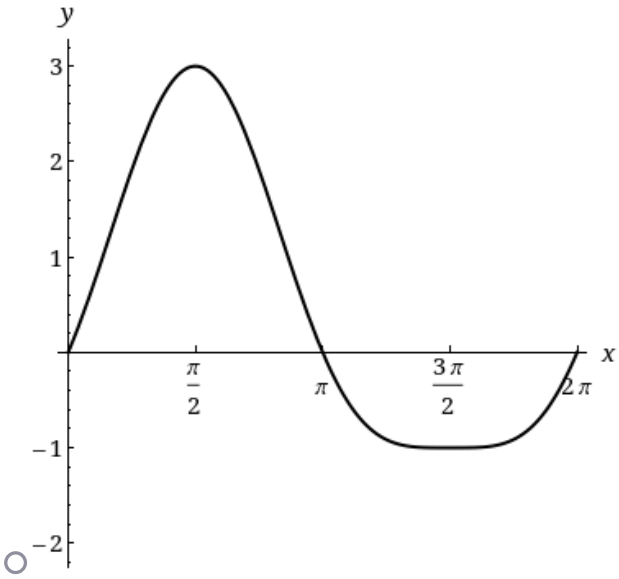
Find the interval(s) where the function is concave up. (Enter your answer using interval notation.)

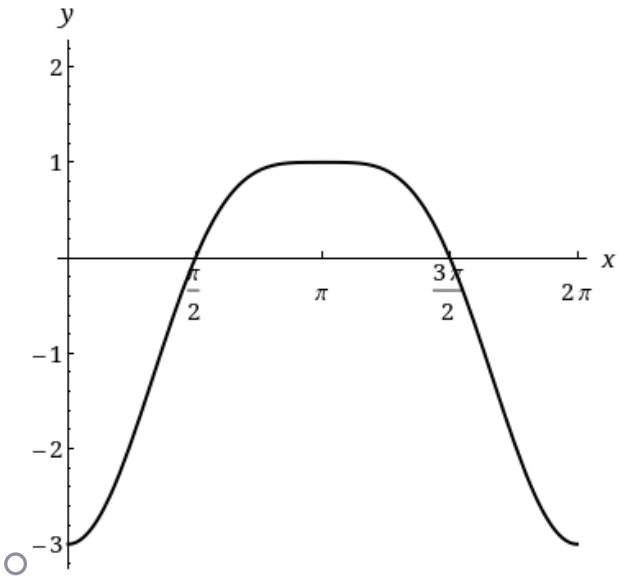
Find the interval(s) where the function is concave down. (Enter your answer using interval notation.)

(d) Use the information from parts (a)–(c) to sketch the graph. Check your work with a graphing calculator of computer.









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10. [–/2 Points] DETAILS SCALCET9 4.XP.3.003.MI.

Consider the equation below.

$$f(x) = 2x^3 + 3x^2 - 12x$$

(a) Find the interval(s) of increase. (Enter your answer in interval notation.)

Find the interval(s) of decrease. (Enter your answer in interval notation.)

(b) Find the local minimum and maximum values of f.

local minimum

local maximum

(c) Find the inflection point.

$(x, y) = ($)

Find the interval on which f is concave up. (Enter your answer in interval notation.)

Find the interval on which f is concave down. (Enter your answer in interval notation.)

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