Question 1 2 3 4 5

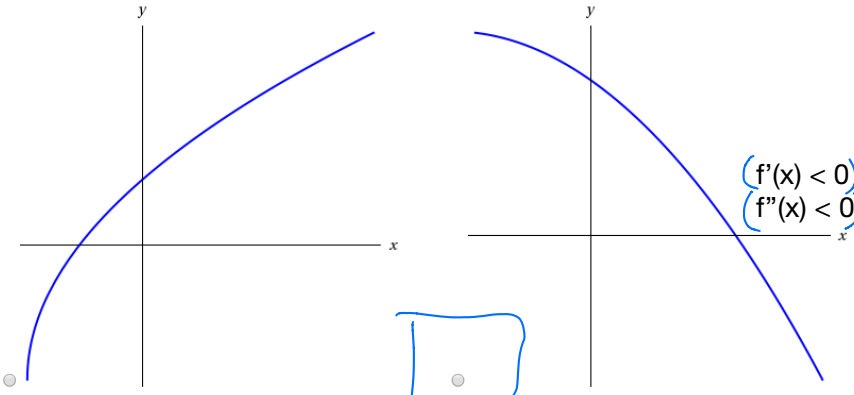
f'( ) ← tells us the slope
f"( ) ← tells us the concavity

Instructions Solution by Shin
Name:_____
Section:_____

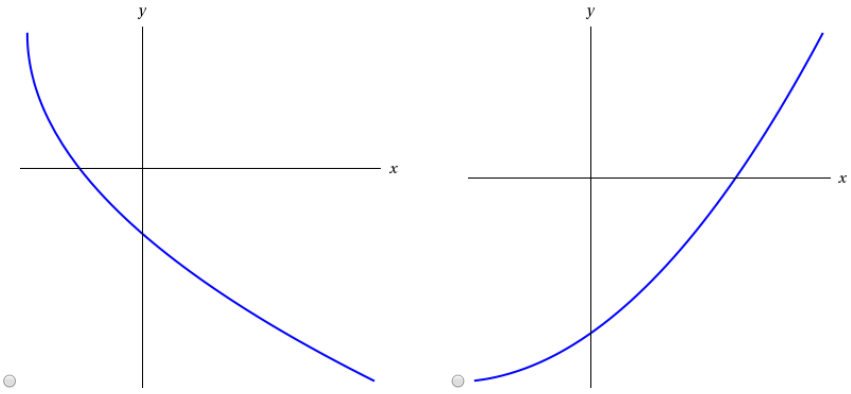
1. Question Details SCalc8 3.3.020. [3353922]

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

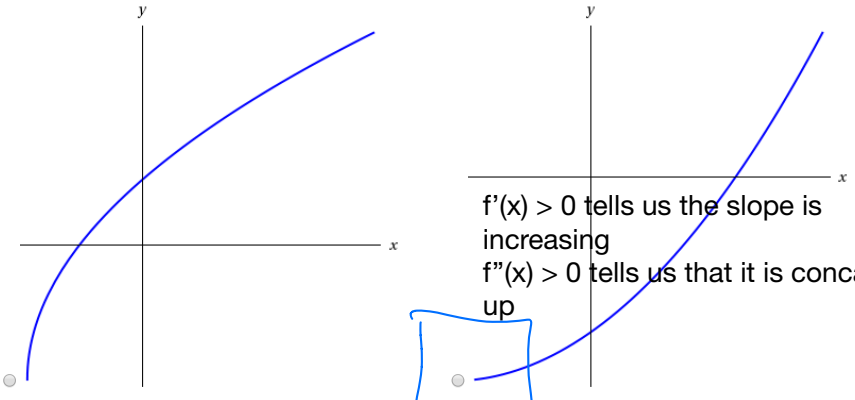
(a) $f'(x) < 0$ and $f''(x) < 0$ for all x



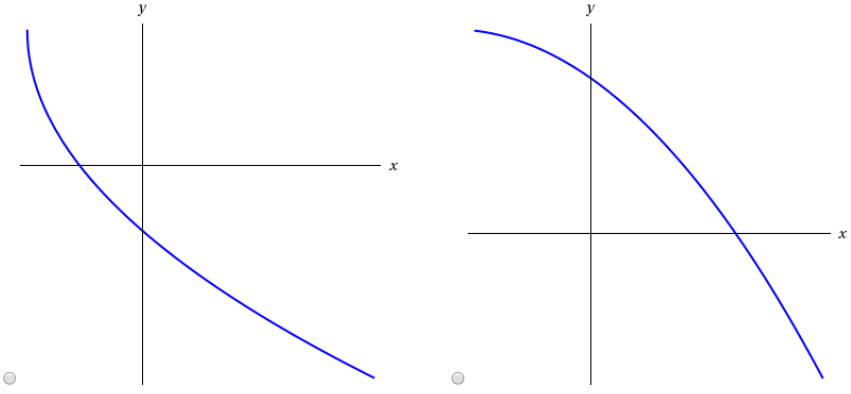
f'(x) < 0 tells us decreasing
f"(x) < 0 tells us concave down



(b) $f'(x) > 0$ and $f''(x) > 0$ for all x

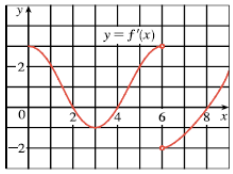


f'(x) > 0 tells us the slope is increasing
f"(x) > 0 tells us that it is concave up



2. Question Details SCalc8 3.3.031. [3353945]

The graph of the derivative f' of a continuous function f is shown below. (Assume f' continues to ∞.)



(a) On what interval is f increasing? (Enter your answer in interval notation.)

[0,2] U [4,6) U [8 , infinity)

← Graph of f' so wherever f' pts in creasing

[2,4]U(6,8]

On what interval is f decreasing? (Enter your answer in interval notation.)

← wherever f' is in negative area

(b) At what value(s) of x does f have a local maximum? (Enter your answers as a comma-separated list.) ← check $f'(x) = 0$ then if its a (-) to (+) transition

2,6

$x =$

At what value(s) of x does f have a local minimum? (Enter your answers as a comma-separated list.) ← check $f'(x) = 0$ then if $f'(x)$ is a (+) to (-) transition

4,8

$x =$

(c) On what interval is f concave upward? (Enter your answer in interval notation.)

Concave up means that the derivative of f'(x) is increasing (3, 6) U (6, ∞)

On what interval is f concave downward? (Enter your answer in interval notation.)

(0, 3)

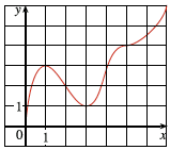
(d) What are the x-coordinate(s) of the inflection point(s) of f? (Enter your answers as a comma-separated list.)

$x =$ 3

(e) Assuming that $f(0) = 0$, sketch a graph of f. (Do this on paper. Your teacher may ask you to turn in this work.)

3. Question Details SCalc8 3.3.002. [3353623]

Use the given graph of f over the interval (0, 7) to find the following.



(a) The open intervals on which f is increasing. (Enter your answer using interval notation.)

(0, 1] U [3, 7)

(b) The open intervals on which f is decreasing. (Enter your answer using interval notation.)

[1, 3]

(c) The open intervals on which f is concave upward. (Enter your answer using interval notation.)

[2, 4) U [5, 7]

(d) The open intervals on which f is concave downward. (Enter your answer using interval notation.)

(0, 2) U (4, 5)

(e) The coordinates of the points of inflection.

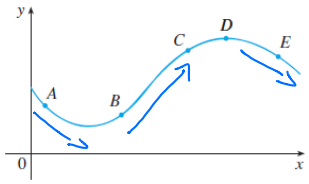
$(x, y) =$ (2, 2) (smallest x-value)

$(x, y) =$ (4, 2.8)

$(x, y) =$ (5, 4) (largest x-value)

4. Question Details SCalc8 3.3.030. [3353628]

The graph of a function $y = f(x)$ is shown. At which point(s) are the following true? (Select all that apply.)



	f'	f''
A	−	+
B	+	+
C	+	−
D	+	−
E	−	−

(f') (f")

(a) $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ are both positive.

- [ ] A
- [x] B
- [ ] C
- [ ] D
- [ ] E

(b) $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ are both negative.

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [x] E

(c) $\frac{dy}{dx}$ is negative but $\frac{d^2y}{dx^2}$ is positive.

- [x] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

5. Question Details SCalc8 3.3.009. [3353668]

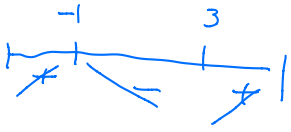
Consider the equation below. (If an answer does not exist, enter DNE.)

$f(x) = x^3 - 3x^2 - 9x + 4$

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

$(-\infty, -1) \cup (3, \infty)$ $f'(x) = 3x^2 - 6x - 9 = 3(x^2 - 2x - 3) = 3(x-3)(x+1)$

Slope change of f'



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

$(-1, 3)$

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

local minimum value: -23

local maximum value: 9

Critical #	f(C.#)
−1	9
3	−23

$9 > -23$

(c) Find the inflection point.

$(x, y) = (1, -7)$ $0 = f''(x) = 6x - 6 = 6(x - 1)$

$x = 1$ $f(1) = -7$

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

$(1, \infty)$

Inflection change

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

$(-\infty, 1)$

Assignment Details

Name (AID): **Sec 12/13 wk10 ws (15571148)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**
Author: **Greuling, Jason (jlgreuling@math.hawaii.edu)**
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