

Calculus Honors Course Distance Learning Packet

Teacher: _____

Teacher's Email: _____

School: _____

Virtual Office Hours:

Conference Call Dial-in Number:

Dial-in Access Code

Online Meeting URL:

Online Meeting ID:

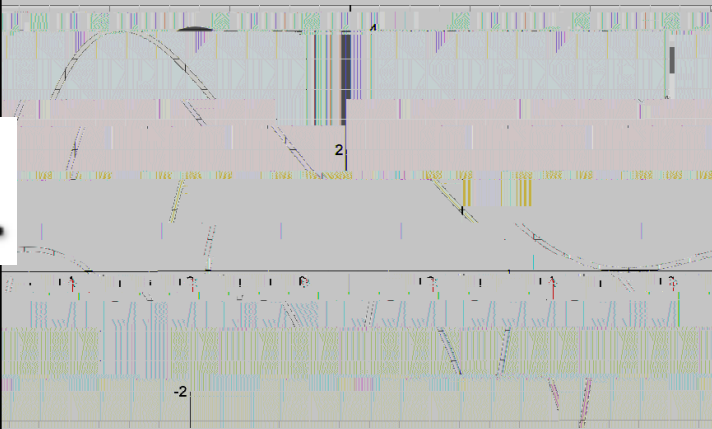
April 13	April 14	April 15	April 16	April 17
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Standard:

Learning Tasks:

Connecting the Graph of $f(x)$ with the graphs of $f'(x)$ and $f''(x)$

Please consider the graph of the following function.



Please list the intervals of increasing, decreasing and maximums and minimums (as close as you can estimate) of the graph to the left. Please also list the intervals of concave up and concave down.

1

Increasing:

Decreasing:

Max:

Min:

Concave up:

Concave down:

Based on the graph of $f(x)$ above please sketch the graph of $f'(x)$.



Please list the zeros of the *derivative*. Please also list the intervals of increasing and decreasing, maxs and mins, and intervals of concave up and down.

Zeros:

Increasing:

Decreasing:

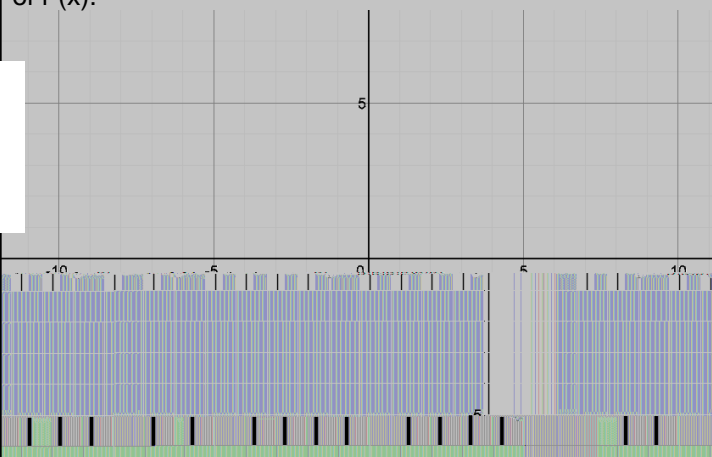
Max:

Min:

Concave up:

Concave down:

Based on the graph of $f'(x)$ above please sketch the graph of $f''(x)$.



Please list the zeros of the *second derivative*. Please also list the intervals of increasing and decreasing, maxs and mins, and intervals of concave up and down.

Zeros:

Increasing:

Decreasing:

Max:

Min:

Concave up:

Concave down:

2

3

Please describe any patterns you notice among the function, first, and second derivative.

4

Please consider the graph of the following function.

Please list the intervals of increasing, decreasing and maximums and minimums (as close as you can estimate) of the graph to the left. Please also list the intervals of concave up and concave down.

Increasing:

Decreasing:

Max:

Min:

Concave up:

Concave down:

Based on the graph of $f(x)$ above please sketch the graph of $f'(x)$.

Please list the zeros of the *derivative*. Please also list the intervals of increasing and decreasing, maxs and mins, and intervals of concave up and down.

Zeros:

Increasing:

Decreasing:

Max:

Min:

Concave up:

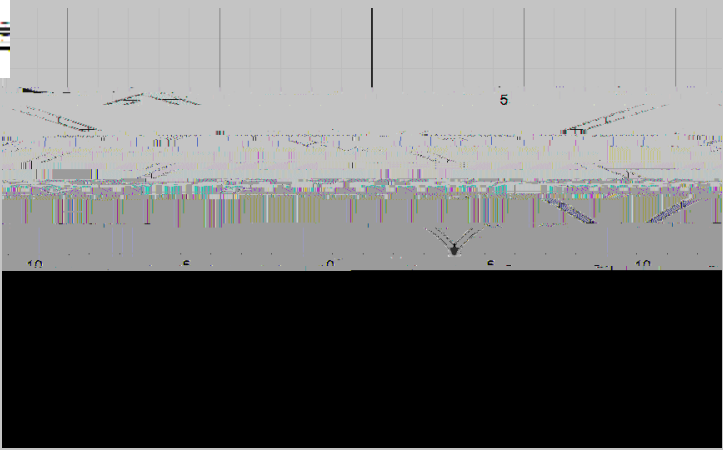
Concave down:

5

Based on the graph of $f'(x)$ above please sketch the graph of $f''(x)$.

Please list the zeros of the *second derivative*. Please also list the intervals of increasing and

6



Connecting the Graph of $f(x)$ with the graphs of $f'(x)$ and $f''(x)$

Follow up questions: Please answer the following using complete sentences and precise mathematical language where appropriate.

1. What do the zeros of the derivative appear to represent in regards to the original function?
2. What do the zeros of the second derivative appear to represent?
3. When the first derivative is above/below the x-axis, what does that appear to represent in the original function?
4. When the first derivative is increasing/decreasing, what does that appear to represent in regards to the original function?
5. When the second derivative is above/below the x-axis, what does that appear to represent in the original function?
6. What does an extrema of the first derivative appear to represent in the original function?
7. Consider the second derivative value at a critical point. How does the sign of this value appear to connect to the extrema in the original function?
8. If I told you the second derivative was always positive, what could you infer about the original function? Always negative? Zero?
9. Please summarize what the first and second derivative tell us about the original function.

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