5.1-What Does f' say about f?

Read Section 5.1 in the text and complete the following on your own :

If $f'(x) > 0$ for all $x \in (a, b)$, then f is increasing on (a, b)

If $f'(x) < 0$ for all $x \in (a, b)$, then f is decreasing on (a, b)

Concavity: up f' inc ($f''>0$)

If $f''(x) > 0$ for all $x \in (a, b)$, then f is concave up on (a, b) (f' inc)

down f' dec ($f''<0$)

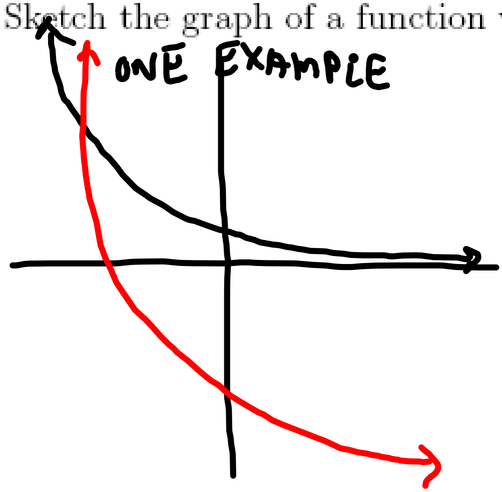
If $f''(x) < 0$ for all $x \in (a, b)$, then f is concave down on (a, b) (f' dec)

Example:

Sketch the graph of a function whose slope is always negative and increasing.

ONE EXAMPLE

f is dec f is conc up



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

NOTE: $f'(x) = -e^{-x}$ always neg

$f''(x) = e^{-x}$ always pos so f' inc

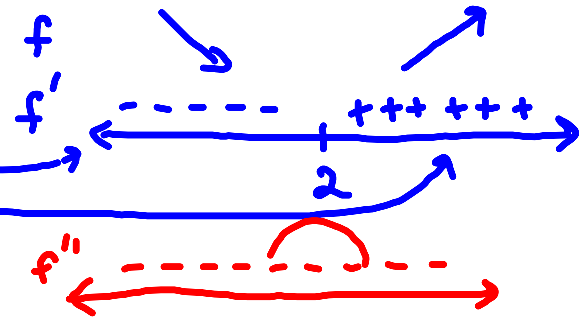
Sketch the graph of a function which satisfies the following:

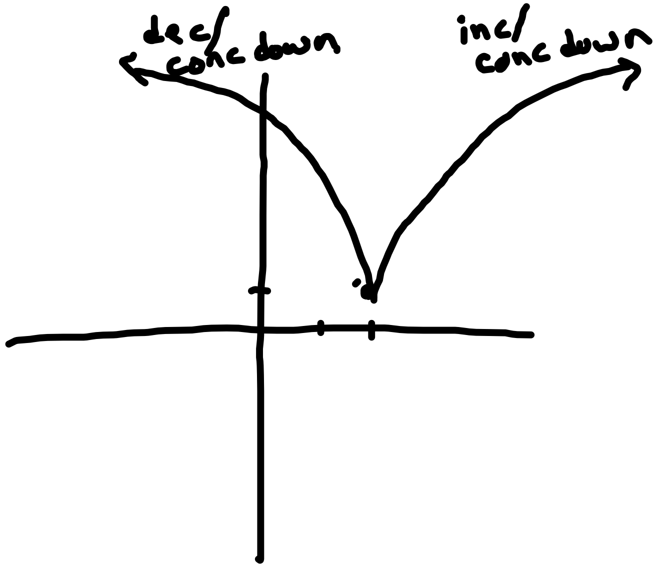
$f(2) = 1$ (2,1)

$f'(x) < 0$ for $x < 2$

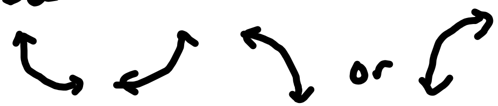
$f'(x) > 0$ for $x > 2$

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



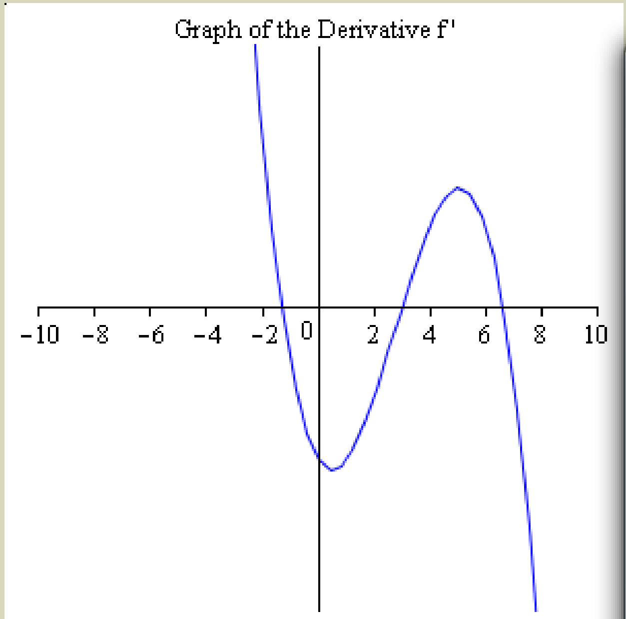


Basic idea:



$++$ $\cup$ $\quad$ $--$ $\cap$

Properties of the Graph of the Derivative



Programmers: D.B. Meade & P.B. Yasskin © Copyright: Maple

Text Question

Give the x-coordinate(s) of all inflection point(s) of f.

max/min of f' (change from inc to d
or dec to inc)

The numbers appearing in your answers must be chos
from the following list:

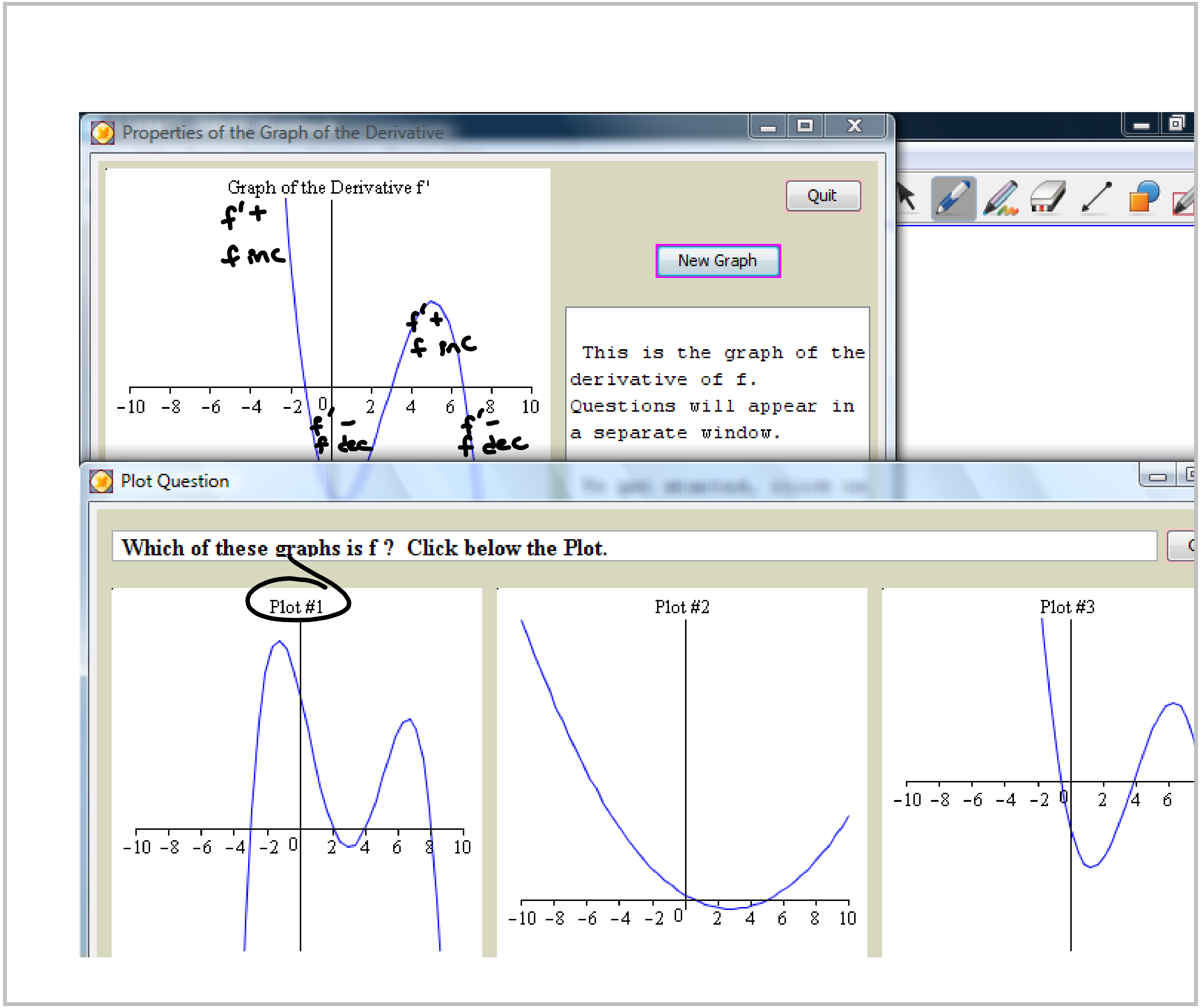
-10.00, -3.01, -1.32, .46, 2.04, 2.98, 3.95, 5.04,
6.59, 8.01, 10.00

Enter Your Answer:

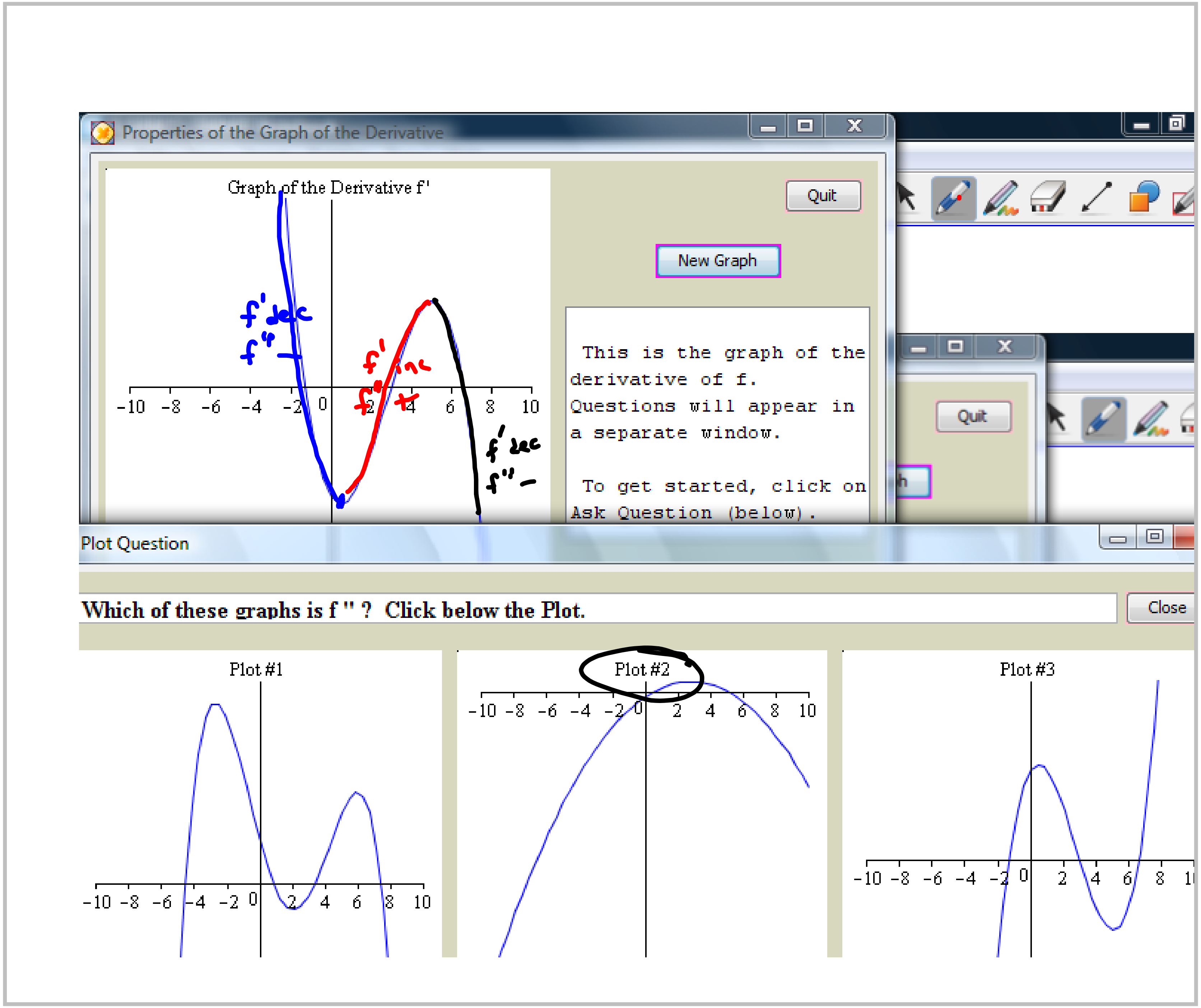
48.

Learn to identify the properties of a function, its derivative and its second derivative from the graph of the second derivative.

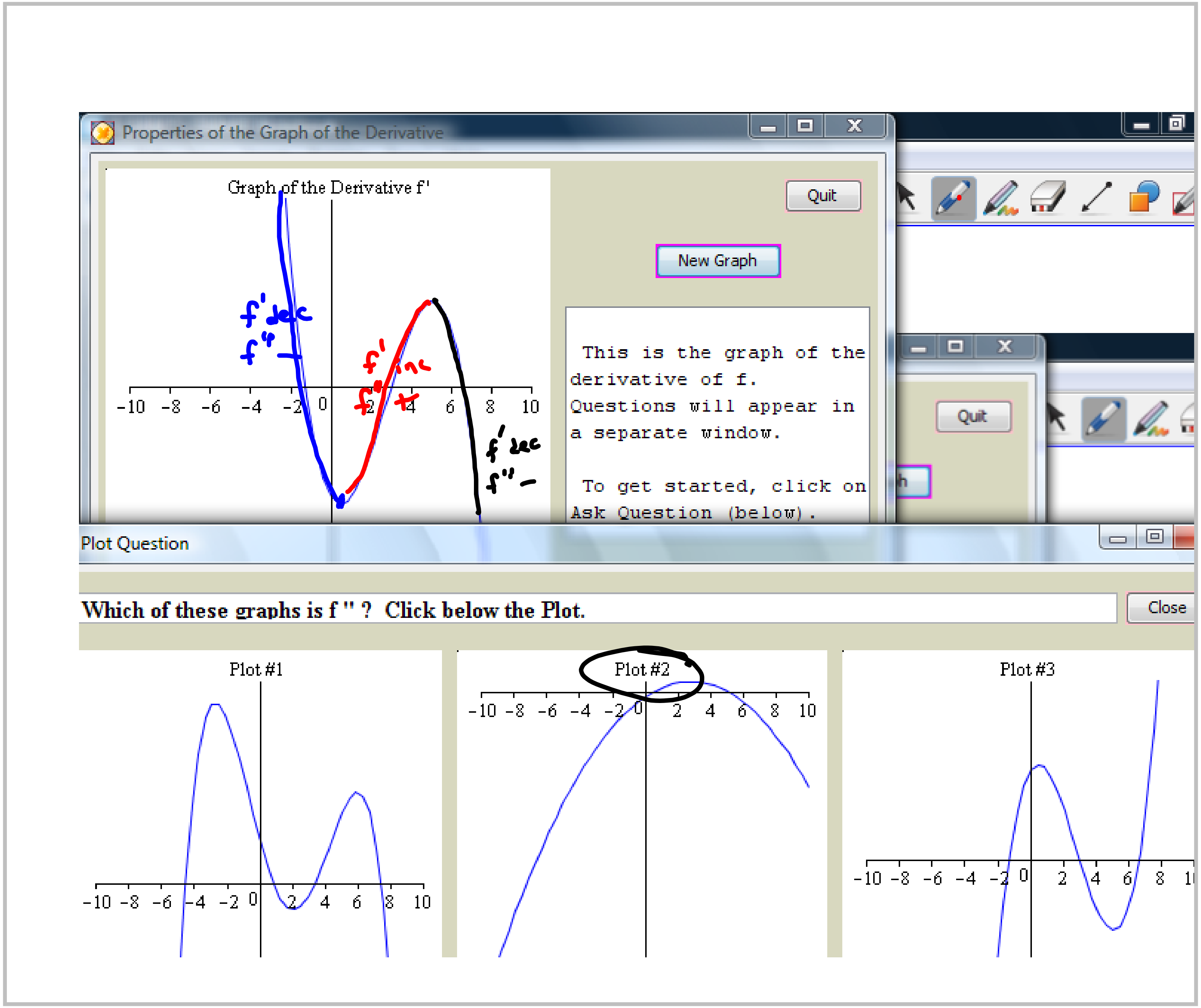
https://www.math.tamu.edu/maple/maplets/Maplets/Graph_df.maplet www.math.tamu



Properties of the Graph of the Derivative
Graph of the Derivative f'
f' +
f inc
f' +
f inc
f' −
f dec
f' −
f dec
Quit
New Graph
This is the graph of the derivative of f. Questions will appear in a separate window.
Plot Question
Which of these graphs is f ? Click below the Plot.
Plot #1
Plot #2
Plot #3



Properties of the Graph of the Derivative
Graph of the Derivative f'
Quit
New Graph
This is the graph of the derivative of f. Questions will appear in a separate window.
To get started, click on Ask Question (below).
f' dec
f'' −
f' inc
f'' +
f' dec
f'' −
Plot Question
Which of these graphs is f '' ? Click below the Plot.
Close
Plot #1
Plot #2
Plot #3



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