Function Analysis Part 1 Assignment

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Function Analysis Part 1 Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

Analyze the following functions using the steps from class.

Question 1

$$f(x) = \frac{9x - 1}{\frac{1}{5}x^2 + 22}$$

[We'll work through this one together in class. Look out for the three inflection points - they may not be obvious on our first graph.]

Step 1: Find the domain of f.

```
1
```

Step 2: Find the derivative f'.

```
2
```

Step 3: Find the critical points of f (where f' is 0 or undefined).

3

Step 4: See if the sign of f' actually changes at the critical points of f, and determine whether f has a local maximum or local minimum at these points.

4

Step 5: Find the second derivative f''.

5

Step 6: Find the critical points of f' (where f'' is 0 or undefined).

6

Step 7: See if the sign of f'' actually changes at the critical points of f', and determine whether f has an inflection point at these points.

7

Step 8: Find the x- and y-intercepts.

8

Step 9: Determine the end behavior.

9

Step 10: Make an informed graph. Mark any x- and y-intercepts, relative maxima and minima, and inflection points.

10

Step 11: Discuss absolute max/min, increasing/decreasing, concave up/down.

Question 2

$g(x) = 2x^4 - 8x^3 - x^2 + 30x$

[Caution: g has two x-intercepts. When you solve $g(x) = 0$, Sage will give you four answers, but only two are real. Convert to decimals and watch out for scientific notation.]

Step 1: Find the domain of g.

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11
```

Step 2: Find the derivative g'.

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12
```

Step 3: Find the critical points of g (where g' is 0 or undefined).

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13
```

Step 4: See if the sign of g' actually changes at the critical points of g, and determine whether g has a local maximum or local minimum at these points.

```
14
```

Step 5: Find the second derivative g''.

```
15
```

Step 6: Find the critical points of g' (where g'' is 0 or undefined).

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16
```

Step 7: See if the sign of g'' actually changes at the critical points of g', and determine whether g has an inflection point at these points.

17

Step 8: Find the x- and y-intercepts.

18

Step 9: Determine the end behavior.

19

Step 10: Make an informed graph. Mark any x- and y-intercepts, relative maxima and minima, and inflection points.

20

Step 11: Discuss absolute max/min, increasing/decreasing, concave up/down.