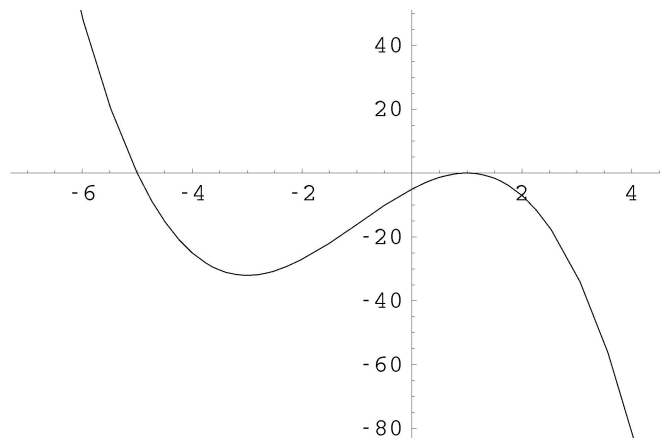


# Quiz 6

Name: \_\_\_\_\_

**Instructions:** Answer the following questions. When computing derivatives, you do not need to use the definition.

1. (3 pts) The following is a graph of a function  $f(x)$ .



List the intervals over which

- $f(x)$  is positive
- $f(x)$  is negative
- $f'(x)$  is positive
- $f'(x)$  is negative
- $f''(x)$  is positive
- $f''(x)$  is negative

2. (4pts) Let  $f(x) = x^5$ . Compute

- $f'(x)$

- $f''(x)$

- $f^{(3)}(x)$

- $f^{(4)}(x)$

- $f^{(5)}(x)$

- $f^{(6)}(x)$

3. (4pts) Compute  $\frac{d}{dx} \left[ \frac{\sqrt[5]{x} + e^x}{x^2 + e^x} \right]$ .

Bonus (1 pt) My friend claims she has found a function which has all of the following properties:

- $f(0) = 0$
- $f'(0) < 0$
- $f''(0) > 0$ .

Can such a function *really* exist? If so, produce an example of such a function. If not, explain clearly why such a function cannot exist.