Using the symmetric difference quotient: The TI 83 has a function that computes the symmetric difference quotient.

The function is located under MATH. number 9.

The syntax for the function is \( \text{SymDiff}(\text{function}, \ x, \ a, \ h) \).

1. Let \( f(x) = \frac{x^3}{3} - 2x^2 - 32x + 1 \)
   a. Graph \( f(x) \) in the window \( x: [-6, 12] \) and \( y: [-40, 60] \).

2. Let \( g(x) = 3x^4 - 4x^3 - 126x^2 + 54x \)
   a. Graph \( g(x) \) in the window \( x: [-10, 10] \) and \( y: [-1000, 1000] \).

b. What degree polynomial is \( f'(x) \)?

c. Use the calculator to solve \( f'(x) = 0 \).

Use Calc. zeros.

d. Use the graph of \( f'(x) \) to find the inflection points of \( f(x) \).

 e. Use the information from part a to graph \( f(x) \).

b. What degree polynomial is \( g'(x) \)?

c. Use the calculator to solve \( g'(x) = 0 \).

d. Use the graph of \( g'(x) \) to find the inflection points of \( g(x) \).

 a. Use the information from part a to graph \( g(x) \).
3. Graph \( f(x) = \sin(3x) \) and \( f'(x) \) in the window \( x: [0, 2\pi] \) and \( y: [-3, 3] \).

a. What is the amplitude of \( f(x) \)? 3

b. What is the amplitude of \( f'(x) \)?

c. What is the period of \( f(x) \) and \( f'(x) \)? \( \frac{2\pi}{3} \)

d. What is the domain and range of \( f'(x) \)?
\(-\infty, \infty\) \([-3, 3]\)

e. What is the domain and range of \( f(x) \)?
\(-\infty, \infty\) \([-1, 1]\)

Let \( f(x) = \frac{2}{3}x^3 - 2x^2 - 100x + 12 \)

1. Graph \( f(x) \) in the window \( x: [-5, 5] \) and \( y: [-1000, 1000] \)

2. What degree polynomial \( g(x) \)?

3. Use the discriminant to solve \( f'(x) = 0 \)

4. Use the graph of \( f'(x) \) to find the inflection points of \( f(x) \).

5. Use the information from parts 1, 3, and 4 to graph \( f(x) \).