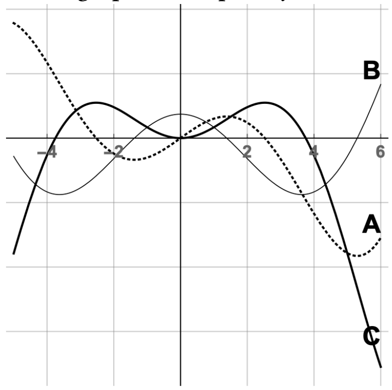
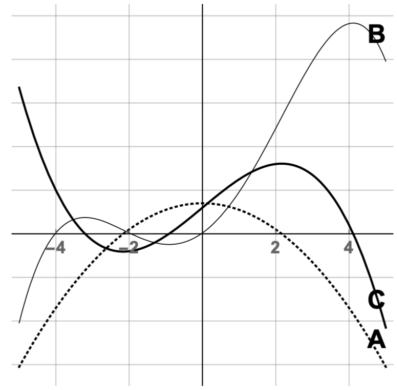
1. The graphs of f, f', and f'' are shown below on the same set of axes.
   Label each on the graph and explain your answers.





2. Suppose that the graph labeled C on the left graph in #1 is the graph of $g'(x)$.
   (a) Is g concave up or concave down at $x = -1$?
   (b) Find all critical points of g and label them as local maxima, local minima, or neither.
   (c) Suppose $g(-2) = 5$. Could $g(1) = 0$? Could $g(1) = 10$?

3. Suppose that the graph labeled B on the right graph in #1 is the graph of $h''(x)$.
   (a) What are the inflection points of h?
   (b) If the critical points of h are $x = -3$, $x = -1$, and $x = 2$, use the Second Derivative Test to classify each as a local maxima or local minima, if possible.

4. Evaluate the following limits. Be sure to explain your answers.

$$\text{(a)} \lim_{x\to\infty} x^2\, e^{-3x} \qquad \text{(b)} \lim_{x\to\infty} \frac{\ln(x)}{\cos(3x)+5}$$

5. Let $f(x) = 3\,x^5 - 25\,x^3 + 7$
   (a) Find all critical points of f and classify them as local maxima, local minima, or neither.
   (b) On which intervals is f increasing? Decreasing?
   (c) Find the inflection points of f.
   (d) On which intervals is f concave up? Concave down?
   (e) Use this information to sketch a graph of $y = f(x)$.

6. Verify that $F(x) = e^x x - e^x + 3$ is an antiderivative of $f(x) = xe^x$.
   What important fact does the Mean Value Theorem tell us about any other antiderivative of f?

7. Why do we use radians to measure angles in calculus rather than degrees?

8. Let $f(x) = e^x$.
   (a) Find the equation of the line tangent to $y = f(x)$ at $x = 0$. Use this to approximate e.
   (b) What is the fifth degree Maclaurin polynomial of $f(x)$? Use it to approximate e.
   (c) Which approximation do you think will be more accurate? Why?

9. Let $g(x) = \sin(x^3)$. What is $g^{(5)}(0)$? $g^{(9)}(0)$? $g^{(100)}(0)$? $g^{(123)}(0)$?
   Be sure to justify your answers.