Name: _____ _____ / 25

Please circle your instructor's name: Leah Berman   Jill Faudree   James Gossell

There are 25 points possible on this quiz. Any outside materials (textbook, course notes, calculator) are not allowed. **For full credit, show all work in a way someone else can follow it.**
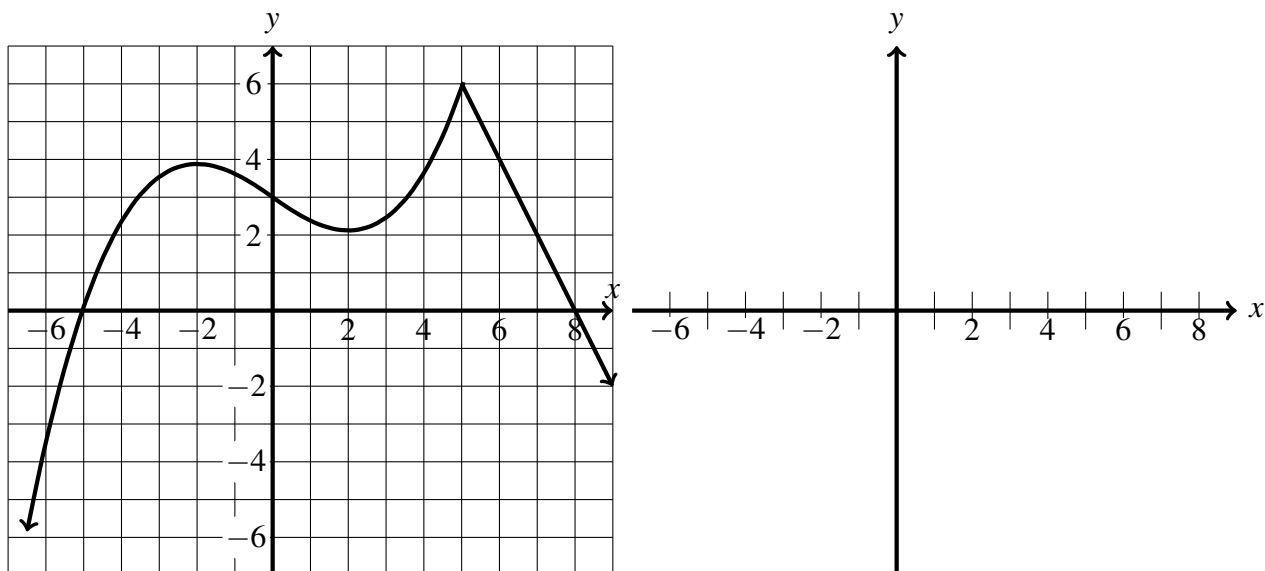
1. (12 points) Let $f(x) = 5x + x^2$.

   (a) Find $f'(x)$ using the derivative rules from Section 3.3.

   (b) Use the definition of the derivative of $f(x)$ (copied below), to confirm that your answer in part (a) is correct.

   $$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}.$$

   (c) Write an equation of the tangent line to $f(x)$ at $x = 1$.

2. (6 points) The graph of $G(x)$ is shown below on the left. On the right axes, sketch $G'(x)$, the derivative of $G(x)$.

3. (4 points) Suppose $V(d)$ gives the number of voles on day d where V is measured in 1000's of voles. Interpret each of the expressions below using complete sentences. Be sure to include units.

   (a) $V(15) = 25$.

   (b) $V'(15) = 0.54$.

4. (3 points) Use the Product Rule to find the derivative of $f(x) = \sqrt{x}\sin(x)$. (Write your answer in a reasonably, cleaned-up way.)