

**LAS Calculus**  
**Computing Derivatives**  
**Homework 4**

1. Find  $f'(x)$  for each of the following.
  - (a)  $f(x) = x^7$
  - (b)  $f(x) = \sqrt{x}$
  - (c)  $f(x) = 1/\sqrt{x}$
  - (d)  $f(x) = 2/x^4$
  - (e)  $f(x) = 3x^4 + 4x^2 + 5$
2. Let  $f(x) = x^2 + x$ .
  - (a) Find  $f'(x)$ .
  - (b) Use the formula from the first part to find  $f'(2)$ ,  $f'(5)$ .
3. Let  $f(x) = 2x^3 + 2x$ .
  - (a) Find  $f'(x)$ .
  - (b) Use the formula from the first part to find  $f'(1)$ ,  $f'(3)$ .
4. Let  $f(x) = 3x^4 + 7x^2 - 6$ .
  - (a) Find  $f'(x)$ .
  - (b) Find  $f''(x)$ .
5. Let  $f(x) = 3x^2 - x$ . Find an equation for the tangent line to the graph  $y = f(x)$  at  $x = 1$ .
6. Let  $f(x) = 2x^3 + 3x^2 + x$ .
  - (a) Find  $f'(x)$ .
  - (b) Find  $f''(x)$ .
  - (c) Find an equation for the tangent line to the graph of  $f$  at  $x = 2$ .
7. Let  $f(x) = 2x^2 - x + 1$ .
  - (a) Find the tangent line to the graph of  $f$  at  $x = 2$ .
  - (b) Use the tangent approximation (about  $x = 2$ ) to approximate  $f(2.1)$ .
8. Let  $f(x) = x^2 + 3x - 1$ .
  - (a) Find  $f(3)$ .
  - (b) Find  $f'(3)$ .
  - (c) Use the tangent approximation (about  $x = 3$ ) to approximate  $f(3.1)$ .
  - (d) Find  $f(3.1)$  exactly.