1. Find the equation of the line tangent to the graph of \( f(x) = 4x + \frac{1}{x} \) when \( x = -1 \).
2. You know two things about the function $f(x)$: $f(0) = 0$, and the graph of $f'(x)$ is as shown below. (That’s $f'(x)$, not $f(x)$!) Sketch the graphs of $f(x)$ and $f''(x)$ on the axes below.

\[ f(x) : \]

\[ f'(x) : \]

\[ f''(x) : \]
3. It’s well known that the number of whiskers on a yeti’s head is proportional to the cube of the yeti’s height. If a 2-meter-tall yeti has 1000 whiskers, how tall is a yeti that has 700 whiskers?

4. Let $f(t)$ be the average height of a $t$-year-old female in the United States in the years 1999-2002. We have the following data (from the CDC):

<table>
<thead>
<tr>
<th>$t$</th>
<th>$f(t)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>59.6</td>
</tr>
<tr>
<td>12</td>
<td>61.4</td>
</tr>
<tr>
<td>13</td>
<td>62.6</td>
</tr>
<tr>
<td>14</td>
<td>63.7</td>
</tr>
</tbody>
</table>

(a) Estimate $f'(14)$.

(b) Use your answer to (a) to estimate the average height of a 15-year-old female.
5. Becky’s heart rate, $H$ (measured in beats/minute), is a function of the amount of coffee she’s drunk, $c$ (measured in liters), so $H = f(c)$.

(a) Explain, in words, the meaning of the following expressions or equations. (Your explanations should be understandable by someone who hasn’t taken calculus. Units may be helpful.)

(i) $f(2) = 120$

(ii) $f^{-1}(90)$

(iii) $f'(2) = 30$

(b) Use the information above to estimate her heart rate when she’s drunk 1.5 liters of coffee.

EXTRA CREDIT State the limit definition of the derivative $f'(a)$. 