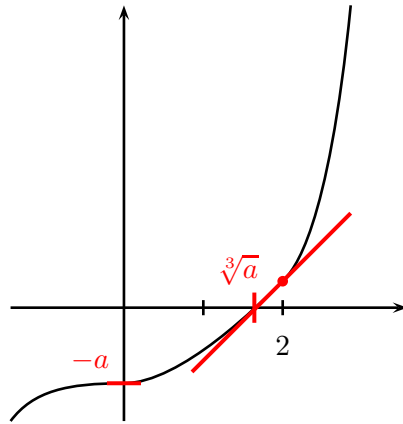8. Let $f(x) = x^3 - a$, for $a > 1$ a constant. The graph of f is shown below.

   (a) (2 points) Find and label the numbers $-a$ and $\sqrt[3]{a}$ on the axes below.

   (b) (4 points) Find the equation for $L(x)$, the linear approximation to f near $x = 2$. Your equation will contain the constant a. Sketch the graph of $L(x)$ on the axes above.

   In general, the equation for L is $L(x) = f'(2)(x - 2) + f(2)$. Since $f(2) = 2^3 - a = 8 - a$, and $f'(2) = 3(2)^2 = 12$, we get

   $$L(x) = 12(x - 2) + 8 - a = 12x - 16 - a.$$

   (c) (4 points) Use the function L to approximate 2.01^3.

   Since $f(x) = x^3 - a$, we see $x^3 = f(x) + a$. Using L to approximate f, we get $x^3 \approx L(x) + a = 12x - 16$ for x near 2. So

   $$2.01^3 \approx 12(2.01) - 16 = 8.12.$$