1. State the chain rule.

2. Let $f'(5) = -2$, $g(3) = 5$, and $g'(3) = 7$. Let $h(x) = 3f(g(x))$. Find $h'(3)$.

3. If $g(x) = \sqrt{f(x)}$, where the graph of $f$ is shown, evaluate $g'(3)$.

4. Find the derivative of the function. *Make sure you use the right derivative notation!*
   
   (a) $f(x) = (x^5 + 7x^3 + 4x^2 + 72)^{99}$
(b) \( f(x) = e^{\sin(ax)} \)

(c) \( g(x) = \tan(x^2 + 5x + 3) \)

(d) \( y = \sqrt{x^8 + 7x^3 + 5} \)

(e) \( y = \ln(t^3 + 7t + 4) \)

(f) \( h(x) = 4x \ln(f(x)) + 5x \)

(g) \( f(x) = \sqrt{\arcsin(e^{7x})} \)
5. Find the second derivative of the function.

(a) \( g(t) = \sin(t^7) \)
(b) \( g(x) = \ln(3\cos(x) + x^3 + 7) \)

(c) \( h(t) = \arctan(t^4) \)

(d) \( f(x) = xg(x^2) \)

6. Use the chain rule to show that if \( \theta \) is measured in degrees, then \( \frac{d}{d\theta} \sin \theta = \frac{\pi}{180} \cos \theta \).
   (This is why we use radians in calculus, else the formulas would be much less simple.)