1. Consider the following twelve functions:

$$f_1(x) = \frac{8}{x^3} \qquad g_1(x) = 3x^7 + 3(7^x) \qquad h_1(x) = \frac{\sqrt{x}}{13}$$

$$f_2(x) = 8\sqrt[3]{x} - \frac{8}{\sqrt[3]{x}} \qquad g_2(x) = e^{x^2} \qquad h_2(x) = 7x^{23} - 23$$

$$f_3(x) = (x^2+1)(x^3-2) \qquad g_3(x) = \frac{x^2+3x+7}{x^3} \qquad h_3(x) = 5x^e - 5e^x$$

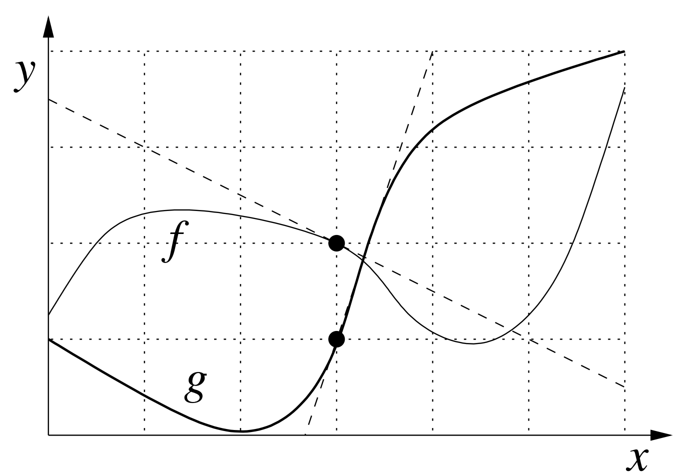
$$f_4(x) = x^2 e^x \qquad g_4(x) = \frac{17}{\sqrt{x}} \qquad h_4(x) = \frac{x^2+3}{x^3-2}$$

It turns out that you can compute the derivatives of eight of these functions using the power, e^x, sum, difference, and constant multiple rules, possibly along with some algebra, and that you can't compute the other four without rules we haven't seen yet.

(a) Identify the four you can't compute yet, and explain why our current list of rules isn't enough to compute them.

(b) Compute the other eight derivatives.

2. Suppose f and g are functions whose graph is shown below, with the indicated tangent lines at $x = 3$. If $h(x) = 13f(x) - 17g(x)$, what is $h'(3)$?



3. Suppose f and g are differentiable functions, and that we know that $f'(4) = -7$ and $g'(4) = 13$. If $h(x) = 8f(x) - 11g(x)$, what is $h'(4)$?