For the following problems, let

$$f(x) = x^9 \qquad \text{and} \qquad g(x) = x^3 - x$$

Find a simple formula for each of the following.

You'll need derivative rules – including the chain rule in *some* parts – but you will also need to read the notation carefully. Part of the exercise is learning to read and understand what's meant by all the symbolic notation, and tell the difference between similar-looking notations with different meaning.

a. $f\left(g(x)\right)$

b. $g\left(f(x)\right)$

c. $f'(x)$

e. $f'\left(2x\right)$

f. $f'\left(x+z\right)$

g. $f'\left(g(x)\right)$

h. $\dfrac{d}{dx} f\left(g(x)\right)$

i. $\dfrac{d}{dx} f\left(2x\right))$

j. $\left(g \circ f\right)'\left(x\right)$

k. $\dfrac{d}{dx}[(x^3 - x)^9]$