

1. Let $f(x) = \ln(x)$, $g(x) = x^2 + 3x$, and $h(x) = \cos(x)$.

Find the following compositions and derivatives.

(a) $(f \circ g)(x)$, $(f \circ g)'(x)$

(b) $(g \circ f)(x)$, $(g \circ f)'(x)$

(c) $(h \circ g)(x)$, $(h \circ g)'(x)$

2. Find the derivatives of the following functions.

(a) $(3x^2 + 2)^{14}$ (g) $\cos(8^x)$

(b) $\ln(\sin x)$ (h) $8^{\cos(x)}$

(c) $3 \cos(\sqrt{x})$ (i) $\tan(\sin(3x))$

(d) $e^{(x^2)}$ (j) $e^{\cos(3x)}$

(e) $(e^x)^2$ (k) $(\sin(3x^2))^2$

(f) $\tan(3x^3 + 7x)$ (l) $\sqrt{\ln(x^2 + 2x)}$