The Chain Rule: Examples

SYMPLIT

1. Differentiate the function $f(x) = \sqrt{4x^3 + 5x}$
2. Differentiate the function $f(x) = \sin\left(\cos x + x^3\right)$
3. Differentiate the function $f(x) = e^{5x^2 \sec x}$
4. Differentiate the function $f(x) = \csc\left(e^{x - \cos x}\right)$
5. Differentiate the function $f(x) = \sqrt[3]{\dfrac{x - e^x}{x + \sin(4x^2)}}$
6. Find an equation of the tangent line to the curve $f(x) = \cos(\sin x)$ at the point $(\pi, 1)$
7. Find the 81st derivative of $y = \sin(5x)$
8. Find the 100th derivative of $f(x) = xe^{3x}$
9. Let $h(x) = f(g(f(x)))$. Using the following table of values, determine $h'(1)$.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	3	2	2	1
2	1	3	1	2
3	2	1	3	3

10. The graph of $f(x)$ is shown below. If $g(x) = 3(f(x))^2 + 1$, find $g'(1)$.