

## Differentiation Rules

1.  $\frac{d}{dx}[c] = 0$
2.  $\frac{d}{dx}[x^n] = nx^{n-1}$
3.  $\frac{d}{dx}[x] = 1$
4.  $\frac{d}{dx}[cf(x)] = cf'(x)$
5.  $\frac{d}{dx}[f(x) + g(x)] = f'(x) + g'(x)$
6.  $\frac{d}{dx}[f(x) - g(x)] = f'(x) - g'(x)$
7.  $\frac{d}{dx}[\sin x] = \cos x$
8.  $\frac{d}{dx}[\cos x] = -\sin x$
9.  $\frac{d}{dx}[e^x] = e^x$

Examples:

Function	Derivative
1. $y = 9$	
2. $f(x) = x^2$	
3. $f(t) = 6t^{-3}$	
4. $y = \frac{2}{3x^2}$	
5. $f(x) = 3x - 1$	
6. $y = 5\cos x$	
7. $f(x) = \sqrt[3]{x}$	
8. $f(x) = x^3 + 2e^x$	

8. Find an equation of the tangent line to the graph of  $f(x) = x^3 + x$  when  $x = -1$