A brief catalog of some derivatives worth memorizing:

$\frac{d}{dx}[c]=0$ The derivative of a constant is 0.

$\frac{d}{dx}[mx+b]=m$ The derivative of a line is its slope.

$\frac{d}{dx}\left[ax^2+bx+c\right]=2ax+b$ The derivative of a quadratic is a line with slope $2a$, y intercept b.

$\frac{d}{dx}\left[e^x\right]=e^x$ $\frac{d}{dx}\left[e^{f(x)}\right]=f'(x)e^{f(x)}$

$\frac{d}{dx}\left[\frac{1}{x}\right]=-\frac{1}{x^2}$ $\frac{d}{dx}\left[\frac{1}{f(x)}\right]=-\frac{f'(x)}{f^2(x)}$

$\frac{d}{dx}\left[\sqrt{x}\right]=\frac{1}{2\sqrt{x}}$ $\frac{d}{dx}\left[\sqrt{f(x)}\right]=\frac{f'(x)}{2\sqrt{f(x)}}$

$\frac{d}{dx}\left[x^2\right]=2x$ $\frac{d}{dx}\left[f^2(x)\right]=2f(x)f'(x)$

$\frac{d}{dx}[\ln x]=\frac{1}{x} \quad x>0$ $\frac{d}{dx}\left[\ln f(x)\right]=\frac{f'(x)}{f(x)}$

$\frac{d}{dx}\left[\sin^{-1}(x)\right]=\frac{1}{\sqrt{1-x^2}}$ $\frac{d}{dx}\left[\sin^{-1}(f(x))\right]=\frac{f'(x)}{\sqrt{1-f^2(x)}}$

$\frac{d}{dx}\left[\tan^{-1}(x)\right]=\frac{1}{1+x^2}$ $\frac{d}{dx}\left[\tan^{-1}(f(x))\right]=\frac{f'(x)}{1+f^2(x)}$

Some of the above are straight forward applications of the power rule, but it is easier to simply remember them (memorize them) than to derive them anew. Note the relation between the right hand column and the left hand column: this is an application of the chain rule.