A4 Q4

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4. If we have *f(x)*, then *f'(x)* describes it's derivative, mapping the slope at each point *x,* where a f'(x)=0 is a place on f(x) where the function has no slope, i.e. a straight line , better known as a critical point. As Newton's method is used to locate 0's (roots) of a function, we can similarly apply it derivatives *of x* to locate roots of the derivative. Thus, to find critical points of *f(x)*, we would need only to alter the original function slightly to find the 0's of the *f'(x)* function. This yields:

$$X_{n+1} = X_n - \frac{f'(x_n)}{f''(x_n)}$$

There is the issue, however, of how we can tell if we are at a $min_x f(x)$ vs a $max_x f(x)$. To figure this out, you would need to take note two points around your final estimation, one that is to the right and one to the left. If the left is negative and the right is positive, that describes a minima. The converse describes a maxima.