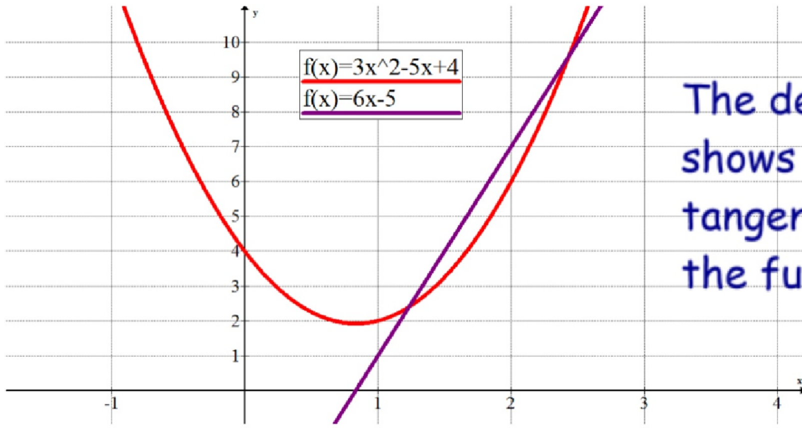
1.6 Derivatives of Polynomial Functions

Recall: $$\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}$$

- represents the slope of the tangent to the curve f(x) where x=a.
- represents the instantaneous rate of change of f(x) where x=a.

Ex. 1 Determine the slope of the tangent to $f(x) = 3x^2 - 5x + 4$ where $x = 2$.

Consider the function: $f(x) = 3x^2 - 5x + 4$ and its derivative function $f'(x)$.



The derivative function shows the slope of the tangent for all x-values of the function.

How can we determine the equation of the derivative function?

Use the limit definition of the slope of a tangent....but instead of using a specific value for x....use x!!! (ie. $a = x$)

Ex. 2 Determine the derivative function, $f'(x)$ for $f(x) = 3x^2 - 5x + 4$.

$$m_{\tan} = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$ for a specifc value of x.

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$ for all values of x. (derivative function)

Ex. 4 Determine f'(x) for each of the following.

a) $f(x) = -2x + 7$

b) $f(x) = 2x^3 + x - 3$

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Ex. 5 Determine where the slope of the tangent to $f(x) = (4x - 5)^2$ is equals 2.

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