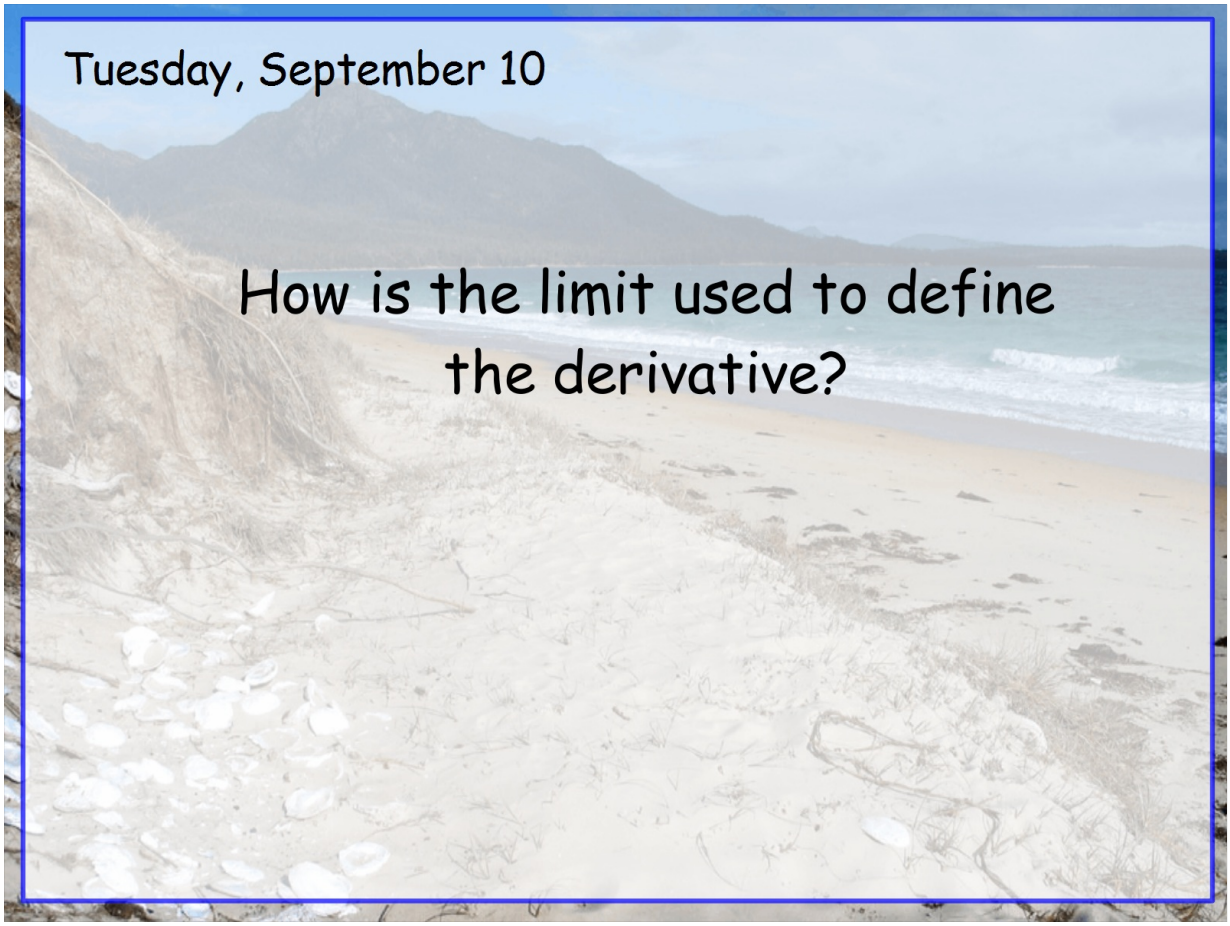

September 10

Students will verbally explain how to find the derivative

(using the words: slope, limit, exponent, coeffiecient...)

What is the definition of the derivative?

$$\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} = f'(x)$$

$$\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} = f'(x)$$

$$\lim_{h\to 0} \frac{(x+h)^2 - x^2}{h} = 2x$$

find the derivative of x^2

$f(x) = x^2$

$f'(x) = 2x$

$$\lim_{h\to 0} \frac{(x+h)^2 - x^2}{h}$$

$$\lim_{h\to 0} \frac{(x+h)(x+h) - x^2}{h}$$

$$\lim_{h\to 0} \frac{x^2+2xh+h^2 - x^2}{h}$$

$$\lim_{h\to 0} \frac{2xh+h^2}{h} = \lim_{h\to 0} \frac{h(2x+h)}{h}$$

$$\lim_{h\to 0} 2x+h = 2x$$

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

$$\lim_{h \to 0} \frac{(x+h)^3 + 2(x+h) - (x^3 + 2x)}{h}$$

$f'(x) = 3x^2 + 2$

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h} = f'(x)$$

$$\lim_{h \to 0} \frac{4(x+h)^2 + 5(x+h) - (4x^2 + 5x)}{h} = 8x + 5$$

find the derivative of $4x^2 + 5x$

$f'(x) = 8x + 5$

$$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}=f'(x)$$

$$\lim_{h\to 0}\frac{\left[10(x+h)^5+2x+2h\right]-\left(10x^5+2x\right)}{h}=50x^4+2$$

find the derivative of $f(x)=10x^5+2x$

$f(x+h)=10(x+h)^5+2(x+h)$

$=10(x+h)^5+2x+2h$

find the equation of the line tangent to $y=10x^5+2x$ at $x=1$

point-slope form

$y-y_1=m(x-x_1)$

point: (x_1, y_1)

slope: m (take the derivative and evaluate at $x=1$)

$y=10x^5+2x$

$y'=50x^4+2$

at $x=1$

$y'=50(1)^4+2=\boxed{52=\text{slope}}$

point:

given $x=1$

evaluate the original function at $x=1$

$y=10(1)^5+2(1)=12$

$y-12=52(x-1)$