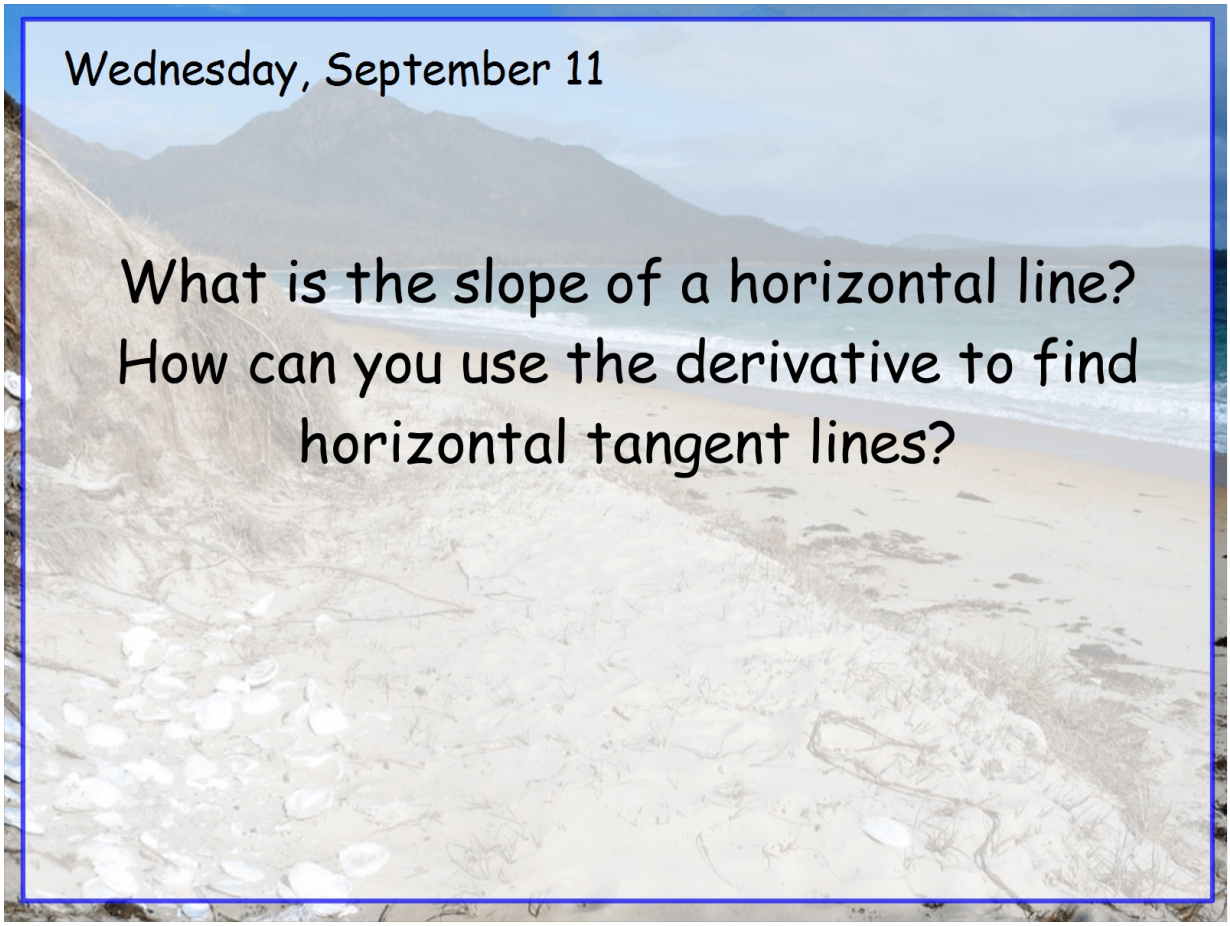


September 11

Students will verbally explain how to find the derivative

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

$f(x)=\frac{x^4}{4}+2x^3-4x^2-5$

find all horizontal tangent lines

→ horizontal tangent lines have a slope of zero

⇒ take the derivative, set the derivative equal to zero, and solve for x

$f(x)=\frac{x^4}{4}+2x^3+4x^2-5$

$f(x)=\frac{1}{4}(x^4)+2x^3+4x^2-5$

$f'(x)=\frac{1}{4}(4x^3)+2(3x^2)+4(2x)-0$

$f'(x)=x^3+6x^2+8x$

$x^3+6x^2+8x=0$

$x(x^2+6x+8)=0$

$x(x+4)(x+2)=0$

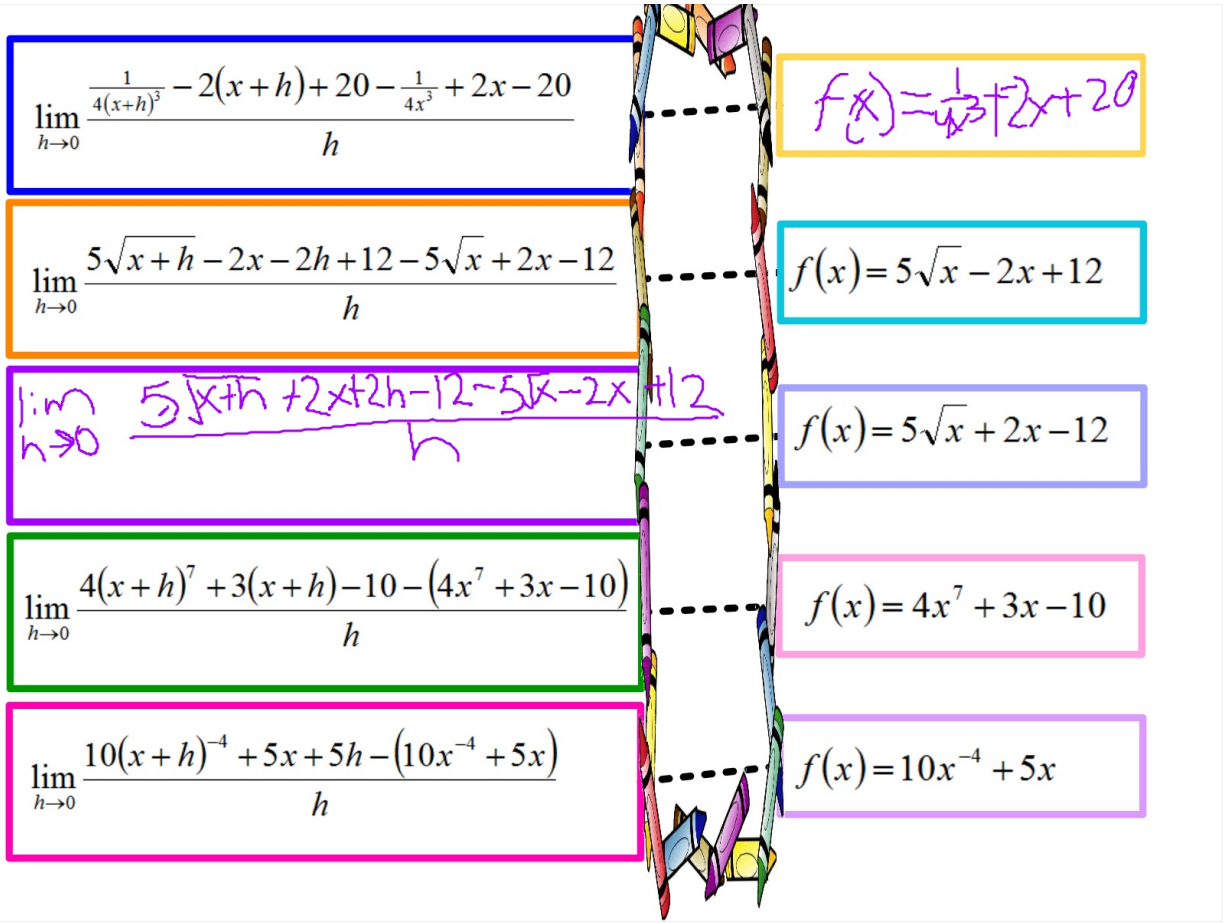
$x=0$

$x+4=0$
$-4\ \ -4 \rightarrow x=-4$

$x+2=0$
$-2\ \ -2 \rightarrow x=-2$

What is the definition of the derivative?

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


$\lim_{h\to 0}\frac{\frac{1}{4(x+h)^3}-2(x+h)+20-\frac{1}{4x^3}+2x-20}{h}$
$\lim_{h\to 0}\frac{5\sqrt{x+h}-2x-2h+12-5\sqrt{x}+2x-12}{h}$
$\lim_{h\to 0}\frac{4(x+h)^7+3(x+h)-10-(4x^7+3x-10)}{h}$
$\lim_{h\to 0}\frac{10(x+h)^{-4}+5x+5h-(10x^{-4}+5x)}{h}$
$f(x)=\frac{1}{4x^3}+2x+20$
$f(x)=5\sqrt{x}-2x+12$
$f(x)=5\sqrt{x}+2x-12$
$f(x)=4x^7+3x-10$
$f(x)=10x^{-4}+5x$