Lecture Handout #13: Oct 13

Online mid-semester course assessment: `https://tlt.stonybrook.edu/evaluate`

The Chain Rule: Derivatives of Composite Functions

Write $y = H(x)$ as a composite: $y = f(z)$, where $z = g(x)$. The derivative of H is

$$H'(x) = \_\_\_\_\_\_\_\_ \cdot \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_ \cdot \_\_\_\_\_\_\_\_$$

Polynomial Functions

$y = H(x)$	$y = f(z)$	$z = g(x)$	$f'(z)$	$g'(x)$	$H'(x)$
$(x^2+1)^2$	z^2	x^2+1			
$(x^2+1)^3$					

Generalized Power Rule: Derivative of $f(x)^n$ is ____________ $\cdot$ ____________

Derivatives from Tables of Values

Some values of functions f and g and their derivatives:

x	1	2	3	4	5
$f(x)$	4	3	1	2	5
$f'(x)$	-1	-2	0	1	4
$g(x)$	5	6	4	2	3
$g'(x)$	2	0	-3	1	2

Composites:

$H(x) = f(g(x))$

$Q(x) = g(f(x))$

$H'(\underline{\ 3\ }) = \_\_\_\_\_\_ \times \_\_\_\_\_\_ = \_\_\_\_\_\_$ $\qquad H'(\_\_\_\_) = \_\_\_\_\_\_ \times \_\_\_\_\_\_ = \_\_\_\_\_\_$

$Q'(\_\_\_\_) = \_\_\_\_\_\_ \times \_\_\_\_\_\_ = \_\_\_\_\_\_$ $\qquad Q'(\_\_\_\_) = \_\_\_\_\_\_ \times \_\_\_\_\_\_ = \_\_\_\_\_\_$