Lecture 19

Thursday, October 3, 2024 1:23 PM

Quotient rule:

$(f+g)' = f' + g'$
$(cf)' = cf'$
$(fg)' = f'g + fg'$
$\left(\frac{f}{g}\right)' = ?$

Notice that $\frac{f}{g} = f\frac{1}{g}$, so it is sufficient to know what $\left(\frac{1}{g}\right)'$ is.
Use limit:

$$\left(\frac{1}{g}\right)'(a) = \lim_{x\to a}\frac{\left(\frac{1}{g}\right)(x) - \left(\frac{1}{g}\right)(a)}{x-a} = \lim_{x\to a}\frac{\frac{1}{g(x)} - \frac{1}{g(a)}}{x-a} = \cdots = -\frac{g'(a)}{g(a)^2}$$

Ex: find the derivative of 1/x and $1/x^2$.
Observe that the result fits with the power rule.

Quotient rule: $\left(\frac{f}{g}\right)' = \frac{f'g - g'f}{g^2}$

Work on problem 1b of the previous worksheet.

Normal line to a curve at a point is the line perpendicular to the tangent line.