Chain Product Quotient (Calculus)

Learning Goal: Learn to identify when a product rule, quotient rule, or chain rule is necessary. This activity is best suited towards a group of students who has already done problems on all three rules, and is now trying to synthesize the results.

Directions: Cut out a page of tiles (page 2) for each group. Then ask them to begin sorting the tiles according to your questions. For each question that is answered, choose one of the tiles and ask students to work out the solution. After checking the answer, move on to the next question.

1. Which tiles require ONLY the use of a product rule?
2. Which tiles require ONLY the use of a quotient rule?
3. Which tiles require ONLY the use of a chain rule?
4. Which tiles require the use of a product rule?
5. Which tiles require the use of a chain rule?
6. Which tiles require the use of a quotient rule?
7. Which tiles require only one chain rule?
8. Which tiles require more than one chain rule?
9. For which tiles is there a chain rule outside of a product or quotient rule?
10. For which tiles is there a chain rule inside of a product or quotient rule?

$\frac{d}{dx}\left(\sin x \cos x\right)$	$\frac{d}{dx}\left[4\left(3x+2\right)^2\right]$
$\frac{d}{dx}\left(\frac{2^x}{x^2}\right)$	$\frac{d}{dx}\left(\sin 2x\right)$
$\frac{d}{dx}\left(3x+2\right)^2$	$\frac{d}{dx}\left(\frac{1}{\left(1-2x\right)^2}\right)$
$\frac{d}{dx}\left(x\ln x\right)^2$	$\frac{d}{dx}\left(\sin^2 x\right)$
$\frac{d}{dx}\left(\frac{\sec 4x}{\tan x}\right)^2$	$\frac{d}{dx}\left(x\ln x\right)$
$\frac{d}{dx}\left(e^{2x}\right)$	$\frac{d}{dx}\left(\sin 2x \cos 2x\right)$
$\frac{d}{dx}\left(\frac{\sec x}{\tan x}\right)$	$\frac{d}{dx}\left(\frac{x^2}{\sin 2x}\right)$
$\frac{d}{dx}\left(2\ln 5x\right)$	$\frac{d}{dx}e^x\left(3x+2\right)^2$
$\frac{d}{dx}\left[e^x\left(3x+2\right)\right]$	$\frac{d}{dx}\left[e^{3x}\left(3x+2\right)^2\right]$