Name: **Date:**

8 – 2.4 The Quotient Rule

Lesson Goals:

- Be able to apply the quotient rule and power of a function rule to find a derivative
- Solve problems using derivatives

1) Quotient Rule

- If $h(x) = \frac{f(x)}{g(x)}$, then $h'(x) = \frac{f'(x)g(x)-f(x)g'(x)}{[g(x)]^2}$, $g(x) \neq 0$.
- In Leibniz notation, $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{\frac{du}{dx}v-u\frac{dv}{dx}}{v^2}$.

Example 1: Use the Quotient Rule to find $h'(x)$.

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

b) $h(x) = \frac{\sqrt{x}}{2-3x}$

- Proof of the Quotient Rule:

Example 2 – Normal Line: Determine the equation of the normal to $y = \frac{2x}{x^2+2}$ at $x = -2$.

Example 3 (Page 98 #13):

a) The radius of a circular juice blot on a piece of paper towel t seconds after it was first seen is modelled by $r(t) = \frac{1+2t}{1+t}$, where r is measured in centimetres.

i) Calculate the radius of the blot when it was first observed.

ii) Calculate the time at which the radius of the blot was 1.5 cm.

iii) Calculate the rate of increase of the radius of the blot when the radius was 1.5 cm.

b) According to this model, will the radius of the blot ever reach 2 cm? Explain your answer.

Homework: Page 97 #1-12, 14-17 (pick and choose)