The derivative of the quotient of two functions.

\[
\left( \frac{f(x)}{g(x)} \right)' = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{(g(x))^2}
\]

Low d-High minus High d-Low
over the denominator squared

MATH is FUN!
\[
\left( \frac{f(x)}{g(x)} \right)' = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{(g(x))^2}
\]
\[
f(x) = \frac{x^2 + 3x - 2}{2 - x^2}
\]
\[
f'(x) = \frac{(2 - x^2)(2x + 3) - (x^2 + 3x - 2)(-2x)}{(2 - x^2)^2}
\]
\[
f'(x) = \frac{4x + 6 - 2x^3 - 3x^2 + 2x^3 + 6x - 4x}{(2 - x^2)^2}
\]
\[
f'(x) = \frac{3x^2 + 6}{(2 - x^2)^2} = \frac{3(x^2 + 2)}{(2 - x^2)^2}
\]

\[
f(x) = \frac{(25 - x^2)^{\frac{1}{2}}}{5x}
\]
\[
\left( \frac{f(x)}{g(x)} \right)' = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{(g(x))^2}
\]
\[
f'(x) = \frac{5x \left( \frac{1}{2} (25 - x^2)^{\frac{1}{2}} \cdot -2x \right) - \left( \frac{25 - x^2}{(5x)^2} \right)(5)\right)}{\frac{1}{25x^2}}
\]
\[
f'(x) = \frac{-5x^2}{\sqrt{25 - x^2}} \cdot \frac{1}{25x^2}
\]
\[
f'(x) = -5x^2 - 5(25 - x^2) \cdot \frac{1}{25x^2} = \frac{-25x^2}{x^2 \sqrt{25 - x^2}}
\]
\[
f'(x) = \frac{-125}{x^2 \sqrt{25 - x^2}} \cdot \frac{1}{25x^2} = \frac{-5}{x^2 \sqrt{25 - x^2}}
\]
Use the quotient rule to find the derivative of each function.

1. \( f(x) = \frac{x}{1-x} \)
2. \( f(x) = \frac{x^2+2}{x-2} \)
3. \( f(x) = \frac{1-x^2}{2-x} \)
4. \( f(x) = \frac{\sqrt{1+x}}{2x} \)
5. \( f(x) = \frac{\sqrt{9-x^2}}{2x} \)
6. \( f(x) = \frac{x^2-x+1}{x^2+1} \)

Find the equation of the tangent line to the graph of the function at the indicated point.

7. \( f(x) = (x^3 - 9)(\sqrt{x+2}) \) at \( x = -1 \)
8. \( f(x) = \frac{x+1}{2x-3} \) at \( x = 2 \)

9. The temperature \( T \) of a person during an illness is given by \( T(t) = \frac{2t}{t^2+1} + 98.6 \), where \( T \) is the temperature, in degrees Fahrenheit, at time \( t \), in hours.
   (a) Find the rate of change of the temperature with respect to time.
   (b) Find the temperature at \( t = 1 \).
   (c) Find the rate of change of the temperature at \( t = 1 \).