

Rates of Change in Rational Functions

Consider the function defined by $f(x) = \frac{x}{x+2}$.

- a) Graph the function.
- b) Find the average rate of change of the function on the interval $[2.99, 3]$. Repeat for the interval $[2.999, 3]$. What is a reasonable estimate for the rate of change at $x = 3$?
- c) Use the algebraically simplified difference quotient to determine the **exact** rate of change of $f(x)$ at $x = 3$.
- d) Determine the equation of the tangent line to $f(x)$ at $x = 3$. Express your answer in $y = mx + b$ form.
- e) Solve $f(x) \leq 2$ algebraically. Verify graphically using part a).