3.3 - Limits and Continuity: Algebraic Approach

I. Continuity of Closed-Form Functions

a. $f(x) = \dfrac{x}{(x+2)(x-3)}$

b. $f(x) = \sqrt{x-4}$

II. Limits: An Algebraic Approach

$$f(x) = \frac{x^2 - 4}{x - 2}$$

numerically:

x	1.9	1.99	1.999	2	2.001	2.01	2.1
$f(x)$							

graphically:

algebraically:

III. More Algebraic Examples

IV. Infinite Limits (Vertical Asymptotes) - The vertical line $x = a$ is a **vertical asymptote** if

$\lim_{x \to a^{\pm}} f(x) = \pm \infty$ (as x approaches a from the left or the right, $f(x) \uparrow$ or $\downarrow$ without bound)

EX:

EX:

V. Limits at Infinity (Horizontal Asymptotes)

For $f(x) = \frac{x^p}{x^q}$, if

A. $p > q$

B. $q > p$

C. $p = q$

EX:

IV. Describing end behavior of a polynomial and rational function.