Lecture Note 3

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MATH1020
General Mathematics

Limits of Rational Functions

Exercises 1 Find the limits:

(a) $\lim_{x \to 2^-} \frac{1}{x-2}$; (b) $\lim_{x \to 2^+} \frac{1}{x-2}$;

(c) $\lim_{x \to 2} \frac{1}{x-2}$; (d) $\lim_{x \to +\infty} \frac{1}{x-2}$; (e) $\lim_{x \to -\infty} \frac{1}{x-2}$.

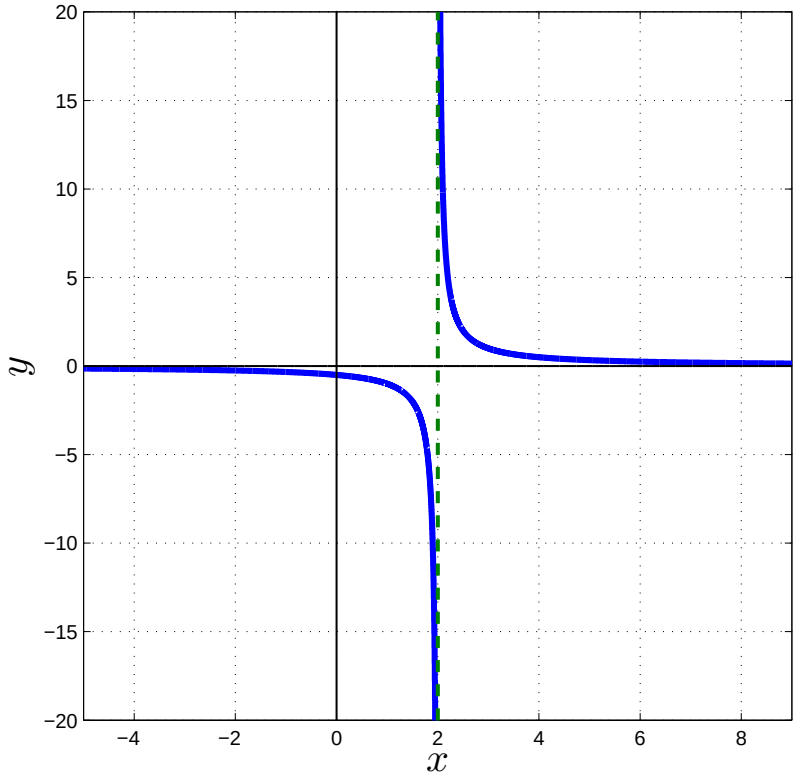

Figure 1: Graph of $y = \dfrac{1}{x-2}$, where $x \in [-5, 9]$.

Exercises 2 Find the limits:

(a) $\lim_{x \to -1^-} \dfrac{3x}{x+1}$;

(b) $\lim_{x \to -1^+} \dfrac{3x}{x+1}$;

(c) $\lim_{x \to -1} \dfrac{3x}{x+1}$;

(d) $\lim_{x \to +\infty} \dfrac{3x}{x+1}$;

(e) $\lim_{x \to -\infty} \dfrac{3x}{x+1}$.

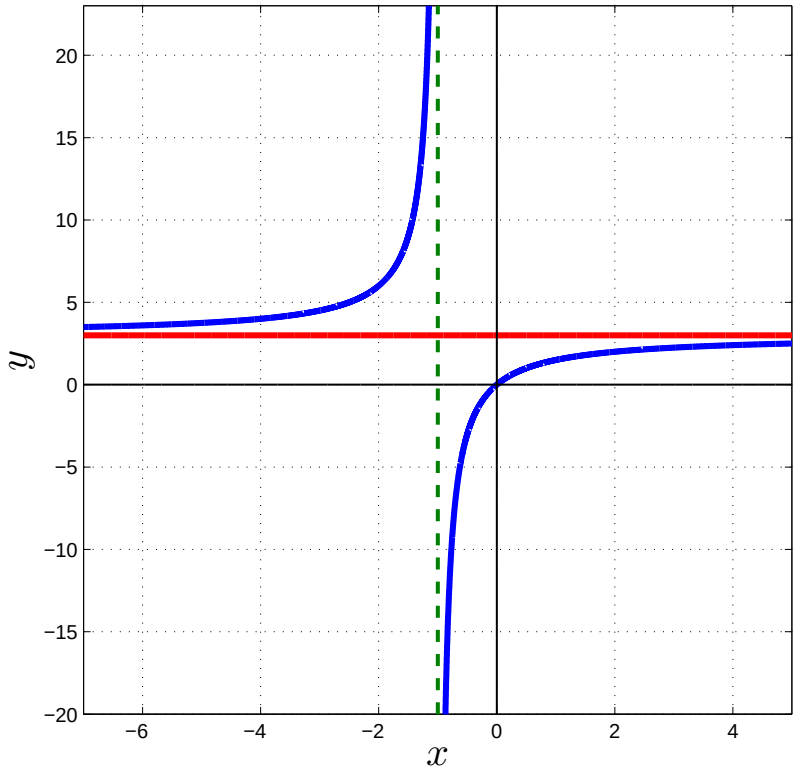

Figure 2: Graph of $y = \dfrac{3x}{x+1}$, where $x \in [-7, 5]$.

Exercises 3 Find the limits:

(a) $\lim_{x \to 0^-} \dfrac{x^2+1}{x}$;

(b) $\lim_{x \to 0^+} \dfrac{x^2+1}{x}$;

(c) $\lim_{x \to 0} \dfrac{x^2+1}{x}$;

(d) $\lim_{x \to +\infty} \dfrac{x^2+1}{x}$;

(e) $\lim_{x \to -\infty} \dfrac{x^2+1}{x}$.

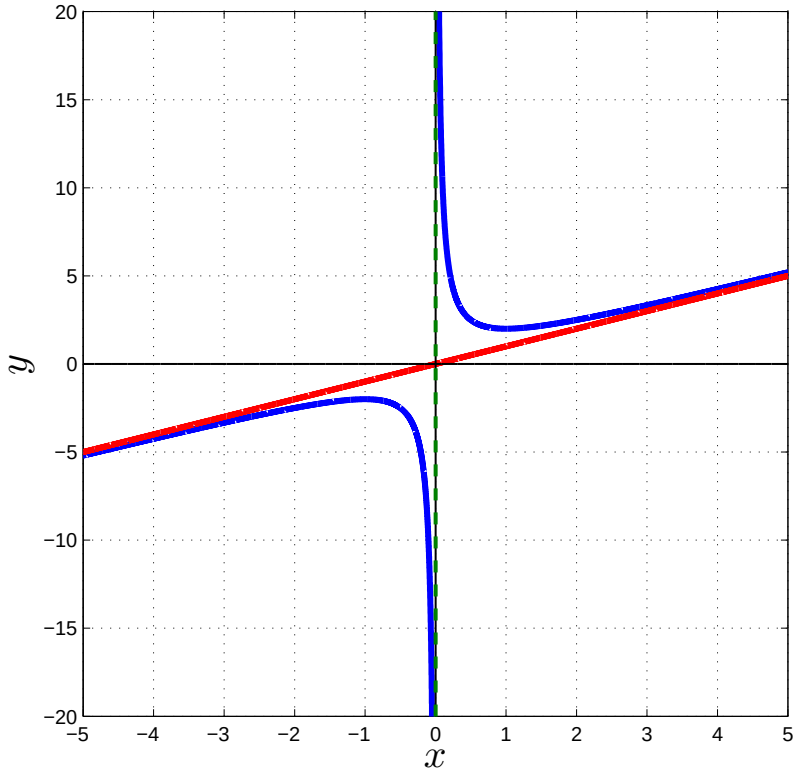

Figure 3: Graph of $y = \dfrac{x^2+1}{x}$, where $x \in [-5, 5]$.