precalc notes 11.4

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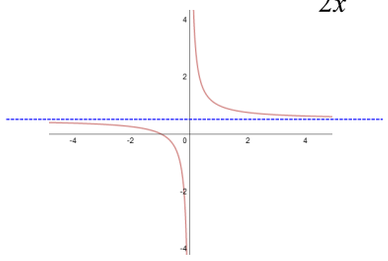
Limits at ∞ and limits of sequences.

Consider the graph $f(x)=\dfrac{x+1}{2x}$



$\lim_{x\to-\infty} f(x)=\dfrac{1}{2}$

$\lim_{x\to\infty} f(x)=\dfrac{1}{2}$

Limits at ∞

$\lim_{x\to\infty}\dfrac{1}{x^r}=0$

Find the limit of each function as x →∞.

1) $f(x)=7-\dfrac{4}{x^2}$

2) $f(x)=\dfrac{-x+4}{5x^2+2}$

3) $f(x)=\dfrac{-x^2+4}{5x^2+2}$

4) $f(x)=\dfrac{-x^3+4}{5x^2+2}$

Sequences

Consider the sequence $a_n=\dfrac{1}{3n}$ $\quad\dfrac{1}{3},\dfrac{1}{6},\dfrac{1}{9},\dfrac{1}{12},\ldots$

$\lim_{n\to\infty}\left(\dfrac{1}{3n}\right)=0$

Find $\lim_{n\to\infty} a_n$.

5) $a_n=\dfrac{4n+5}{n-1}$

6) $a_n=\dfrac{4n+5}{n^2-1}$

7) $a_n=\dfrac{4n+5}{12n^2}$

8) $a_n=\dfrac{4n^2+5}{n^2}$

9) $a_n=\dfrac{5}{n^3}\left[\dfrac{n(n+1)(2n+1)}{6}\right]$