

20) $\lim_{x \rightarrow -\infty} \frac{4x^2 - x - 1}{3x^2 + 1}$

As x gets small without bound, $\frac{4x^2 - x - 1}{3x^2 + 1}$ approaches $\frac{4}{3}$.

x	0	-1	-2	-10	-100	-1000
$f(x)$	-1	1	1.3265	1.3336	1.3333	1.3333

The denominator is slightly smaller than the numerator as x increases, making $f(x)$ approach a number just over 1.

22) $\lim_{x \rightarrow \infty} \frac{x^3 - 1}{2x^4 + 1}$

As x gets large without bound, $\frac{x^3 - 1}{2x^4 + 1}$ approaches 0.

x	0	1	10	100	1000
$f(x)$	-1	0	0.04995	0.005	0.0005

The denominator becomes much larger than the numerator which makes $f(x)$ approach 0 as x increases.

28) $\lim_{x \rightarrow \infty} \frac{2}{1 + e^x}$

As x gets large without bound, $\frac{2}{1 + e^x}$ approaches 0.

x	0	1	10	100
$f(x)$	1	0.53788	9.1×10^{-5}	7×10^{-44}

The denominator becomes very large as x increases which makes $f(x)$ approach 0.