Math 21A, Winter 2024.

Discussion Problems 2 (Tue., Jan. 30)

1. Compute the following limits:

(a) $\lim_{x\to\infty} \dfrac{2+x-x^2}{3+5x+7x^2}$ (b) $\lim_{x\to\infty} \dfrac{(3x+1)^3(x-2)}{(x+3)^3(x^2-8)}$ (c) $\lim_{x\to\infty} \dfrac{x^2\sin(x^3)}{x^3+1}$

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

2. Compute the following limits:

(a) $\lim_{x\to 1-} \dfrac{2+\sqrt{x+3}}{2-\sqrt{x+3}}$ (b) $\lim_{x\to 1+} \dfrac{\sqrt{x-1}}{2-\sqrt{x+3}}$ (c) $\lim_{x\to 1+} \dfrac{(x-1)^{3/2}}{2-\sqrt{x+3}}$

3. Graph the function $y = \dfrac{2x^2-3x-2}{x^2-1}$ using intercepts and asymptotes. Find all intersections between the function and its asymptotes.

4. Let $f(x) = \dfrac{x^2+1}{x}$ and $g(x) = \dfrac{x+2}{x^2}$. Do the graphs of $y = f(x)$ and $y = g(x)$ intersect for some $x > 0$?