MATH 131: WORKSHEET 2

Limits and asymptotes

Questions

(1) Find the roots and vertical asymptotes of the following functions

(a) $f(x) = \dfrac{x-9}{x-4}$ (b) $h(x) = \dfrac{2x-9}{x-4}$ (c) $g(x) = \dfrac{x-9}{3x-4}$

(2) Compute the following limits. Interpret your results in terms of asymptotes.

(a) $\lim\limits_{x\to\infty}\left[\dfrac{x-9}{x-4}\right]$ (b) $\lim\limits_{x\to\infty}\left[\dfrac{2x-9}{x-4}\right]$ (c) $\lim\limits_{x\to\infty}\left[\dfrac{x-9}{3x-4}\right]$

(3) Use the results of problems (1) and (2) to make rough sketches of the three functions $f(x)$, $g(x)$, and $h(x)$.

(4) Each of the three functions $f(x)$, $g(x)$, $h(x)$ can be constructed by starting with the function $\frac{1}{x}$ and then shifting and stretching. For each function list the transformations needed to start with $\frac{1}{x}$ and end up with that function.

Responses