Calculus 1510 Tutorial 2

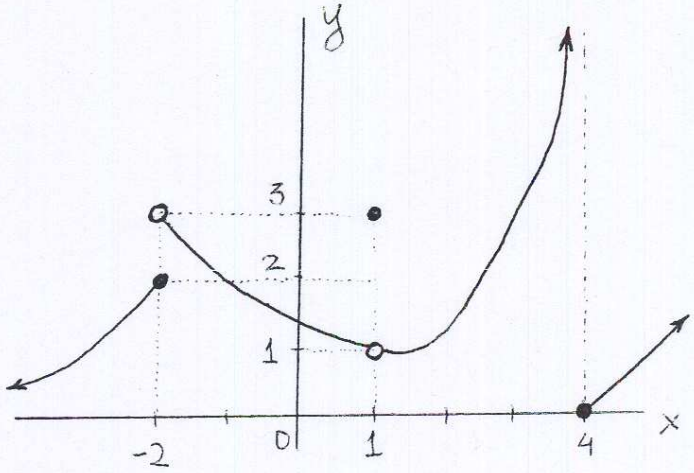
I. Evaluate the limit, if it exists

(a) $\lim_{x\to\infty} \dfrac{x^2+1}{2x^3+5}$ (b) $\lim_{x\to-\infty} \dfrac{2+x-x^2}{3+4x^2}$ (c) $\lim_{x\to-\infty} \dfrac{\sqrt{1+2x^2}}{x+2}$

(d) $\lim_{x\to\infty} (\sqrt{x^2+4} - \sqrt{x^2-1})$

II. Find horizontal and vertical asymptotes for the graph of $f(x) = \dfrac{5x^2+1}{-2+x+x^2}$.

III. Is the function on the graph below continuous / right continuous / left continuous / discontinuous (which type of discontinuity) at the points $x = -2, 1, 4$?



IV. (a) Is $f(x) = \begin{cases} \cos x & x > 0 \\ -x^2+1 & x \le 0 \end{cases}$ continuous at $x = 0$?

(b) Find the value(s) of k if $f(x) = \begin{cases} kx+2 & x \ge -1 \\ k^2x^2 & x < -1 \end{cases}$ is continuous for all x.