Drawing graphs with calculus

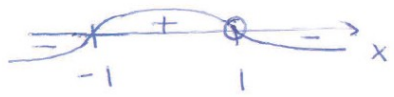
4.5.1

I a) Domain: $x \neq 1$, y-intercept: $y = f(0) = \frac{1 \cdot (-2)}{(-1)^2} = -2$,

x-intercepts: $f(x) = 0 \Leftrightarrow (1-2x)\cdot(x-2) = 0 \Leftrightarrow x = \frac{1}{2}$ and $x = 2$,

symmetry: NONE, vertical asymptote(s): $x = 1$, horizontal asymptote(s): $y = -2$ ($\lim_{x \to \pm\infty} f(x) = \lim_{x \to \pm\infty} \frac{(\frac{1}{x}-2)\cdot(1-\frac{2}{x})}{(1-\frac{1}{x})^2} = \frac{(0-2)\cdot(1-0)}{(1-0)^2} = -2$);

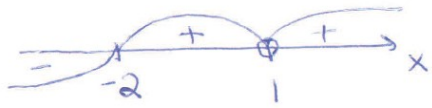
f':



interval(s) of increase: $(-1,1)$, int. of decrease: $(-\infty,-1)$ and $(1,\infty)$

local min at $x = -1$: $f(-1) = \frac{3\cdot(-3)}{(-2)^2} = -\frac{9}{4}$ - point $(-1, -\frac{9}{4})$,

f'':



f is concave up on $(-2,1)$ and $(1,\infty)$, f is conc. down on $(-\infty,-2)$

inflection point at $x = -2$: $f(-2) = \frac{5\cdot(-4)}{(-2-1)^2} = -\frac{20}{9}$ - point $(-2, -\frac{20}{9})$