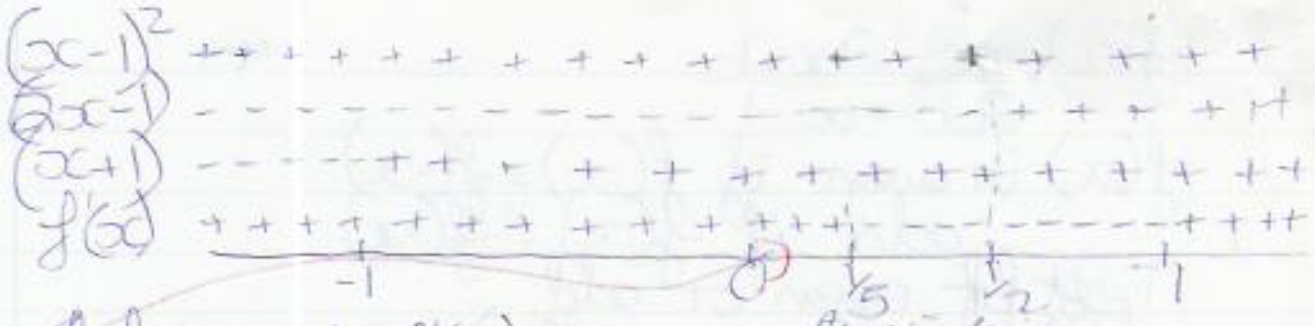


for $x > 1$ $f'(x) > 0$
for $\frac{1}{2} < x < 1$ $f'(x) < 0$
for $\frac{1}{5} < x < \frac{1}{2}$ $f'(x) > 0$
for $-1 < x < \frac{1}{5}$ $f'(x) < 0$
for $x < -1$ $f'(x) > 0$

max.

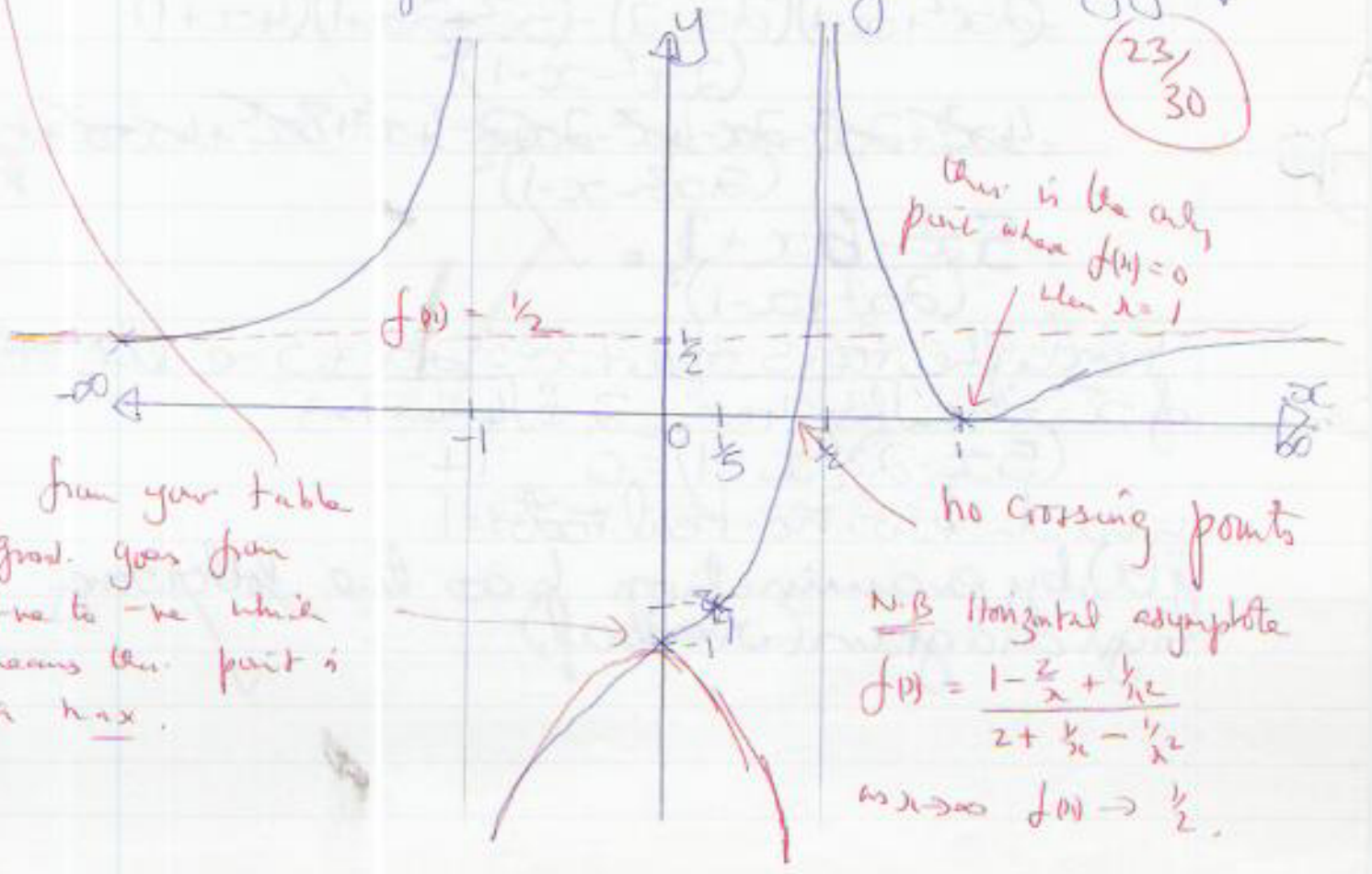
min.

$f(0) = -1$

We have the following table of values for $f(x)$

x	$-\infty$	-1^-	-1^+	0	$\frac{1}{5}$	$\frac{1}{2}^-$	$\frac{1}{2}^+$	1	∞
$f(x)$	$\frac{1}{2}^+$	∞^+	∞^-	-1	$-3/4$	∞^-	∞^+	0	$\frac{1}{2}^-$
$f'(x)$	-0^+	∞^+		1	0	∞	∞^-	0	0^+

We therefore sketch the following graph



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This is the only point where $f(x) = 0$ when $x = 1$

from your table graph goes from $+\infty$ to $-\infty$ which means this point is a max.

No crossing points

N.B Horizontal asymptote

$$f(x) = \frac{1 - \frac{2}{x} + \frac{1}{x^2}}{2 + \frac{1}{x} - \frac{1}{x^2}}$$

as $x \to \infty$ $f(x) \to \frac{1}{2}$.