

Graph the function $f(x) = \frac{x-1}{x^2}$ using the full procedure discussed in class.

SCORE: ___ / 20 POINTS

[1] DOMAIN $\{x \neq 0\}$

DISCONTINUITY AT $x=0$

[2] X-INT: $\frac{x-1}{x^2} = 0 \Rightarrow x=1$

Y-INT: DNE ($x=0 \notin \text{DOMAIN}$)

[3] $\lim_{x \rightarrow 0^-} \frac{x-1}{x^2} = -\infty$ $\left(\frac{-1}{0^+}\right)$
 $\lim_{x \rightarrow 0^+} \frac{x-1}{x^2} = -\infty$ $\left(\frac{-1}{0^+}\right)$ } VA $\frac{1}{2}$

↑ STATED OR DRAWN

[4] $\lim_{x \rightarrow \infty} \frac{x-1}{x^2} = \lim_{x \rightarrow \infty} \frac{1}{2x} = 0$
 $\lim_{x \rightarrow -\infty} \frac{x-1}{x^2} = \lim_{x \rightarrow -\infty} \frac{1}{2x} = 0$ } HA $\frac{1}{2}$

↑ STATED OR DRAWN

[5] $f(x) = x^{-1} - x^{-2}$

$f'(x) = -x^{-2} + 2x^{-3} = -x^{-3}(x-2)$

DNE IF $x=0 \notin \text{DOMAIN}$

$=0$ IF $x=2$ POINT $(2, \frac{1}{4})$

$f''(x) = 2x^{-3} - 6x^{-4} = 2x^{-4}(x-3)$

DNE IF $x=0 \notin \text{DOMAIN}$

$=0$ IF $x=3$ POINT $(3, \frac{2}{9})$

[6] N/A

[7] $-x^{-3}$ + - - -
 $x-2$ - - + +
 $2x^{-4}$ + + + +
 $x-3$ - - - +

[8] f' $\begin{matrix} - & + & - & - \end{matrix}$
 [9] f'' $\begin{matrix} - & - & - & + \end{matrix}$
 [10] $\begin{matrix} \swarrow & \searrow & \swarrow & \searrow \end{matrix}$

2

