Question

a) Function $f\left(x\right)=\frac{\left(3x-2\right)}{\left(3x+1\right)}$. Domain of the function is: $x\in\left(-\infty,-\frac{1}{3}\right)\cup\left(-\frac{1}{3},\infty\right)$.

$$f^{'}\left(x\right)=\left(\frac{3x-2}{3x+1}\right)^{'}=\frac{3\cdot\left(3x+1\right)-3\cdot\left(3x-2\right)}{\left(3x+1\right)^{2}}=\frac{9x+3-9x+6}{\left(3x+1\right)^{2}}=\frac{9}{\left(3x+1\right)^{2}}$$

$$f^{''}\left(x\right)=\left(\frac{9}{\left(3x+1\right)^{2}}\right)^{'}=\frac{-2\cdot3\cdot9\cdot\left(3x+1\right)}{\left(3x+1\right)^{4}}=-\frac{54}{\left(3x+1\right)^{3}}$$

So, we can say that there is no any critical points which are in the domain of this function: there is no maximum, minimum or inflection points.

b) We have:

Vertical asymptote: $x=-\frac{1}{3}$.

$$\begin{cases}\lim\limits_{x\to-\infty}\left(\frac{3x-2}{3x+1}\right)=\lim\limits_{x\to-\infty}\left(\frac{3-2/x}{3+1/x}\right)=1\\ \lim\limits_{x\to\infty}\left(\frac{3x-2}{3x+1}\right)=\lim\limits_{x\to\infty}\left(\frac{3-2/x}{3+1/x}\right)=1\end{cases}\Rightarrow\text{there is a horizontal assymptote } y=1.$$

c) There x- intercept: $\frac{3x-2}{3x+1}=0\Rightarrow x=\frac{2}{3}\Rightarrow$ x-intercept $\left(\frac{2}{3},0\right)$. And y-intercept:

$f\left(0\right)=\frac{0-2}{0+1}=-2\Rightarrow$ y-intercept: $\left(0,-2\right)$.