Quiz # 6
Math 101-Section **01** Calculus I
16 March, 2018, Friday
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Solution Key

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Q-1) Let $f(x) = \dfrac{4x^2 + x - 2}{x + 1}$.

(i) Calculate, and simplify $f'(x)$.

(ii) Calculate, and simplify $f''(x)$.

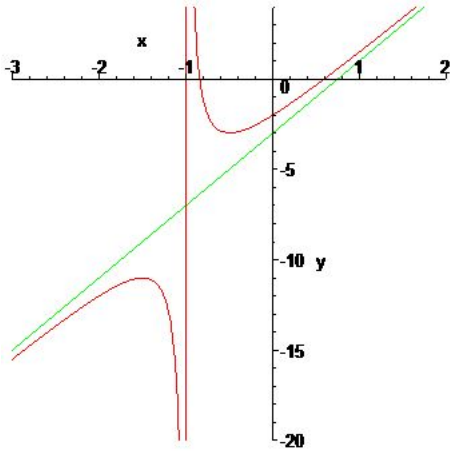
(iii) Plot the graph of $y = f(x)$ indicating all significant data on the graph, such as roots, local min/max, concavity, inflection points, asymptotes.

Answer:

$f(x) = \dfrac{4x^2 + x - 2}{x + 1} = (4x - 3) + \dfrac{1}{x + 1} = 0$ when $x = -\dfrac{1}{8} \pm \dfrac{\sqrt{33}}{8}$. Clearly one root is slightly less than zero and the other is slightly larger than zero. (0.59 and -0.84)

$f'(x) = 4 - \dfrac{1}{(x+1)^2} = \dfrac{4x^2 + 8x + 3}{(x+1)^2} = 0$ when $x = -\frac{1}{2}$ or $x = -\frac{3}{2}$.

$f''(x) = \dfrac{2}{(x+1)^3}$.

Note that we have a vertical asymptote $x = -1$ and a slant asymptote $y = 4x - 3$.

Here is the graph: