Quiz # 6
Math 101-Section **06** Calculus I
15 March, 2018, Thursday
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Solution Key

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Q-1) Let $f(x) = \dfrac{3x^2+7x+5}{x+1}$.

(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:

$f(x) = \dfrac{3x^2+7x+5}{x+1} = (3x+4) + \dfrac{1}{x+1} = 0$ has no root since the discriminant of the numerator is negative.

$f'(x) = \dfrac{3x^2+6x+2}{(x+1)^2} = 0$ when $x = -1 \pm \dfrac{1}{\sqrt{3}}$. Clearly one root is slightly less than -1 and the other is slightly larger than -1. (-0.42 and -1.57)

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

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

Here is the graph: