

1. Consider $y = \frac{x^2 + x + 1}{x} = x + 1 + \frac{1}{x}$

- (a) Find the *equation(s)* of the vertical asymptote(s) if possible, or state that there is none. Show, and/or explain your work.

$$x = 0$$

4 pts

$$\lim_{x \rightarrow 0^+} f(x) = \infty$$

$$\lim_{x \rightarrow 0^-} f(x) = -\infty$$

- (b) Find the *equation(s)* of the horizontal asymptote(s) if possible, or state that there is none. Show, and/or explain your work.

None

4 pts

- (c) Find the *equation(s)* of the slant asymptote(s) if possible, or state that there is none. Show, and/or explain your work.

$$y = x + 1$$

because as $x \rightarrow \pm \infty$, $f(x) \rightarrow x + 1$

4 pts

2. Suppose the line given by $y = 6x - 1$ is tangent to the curve given by $y = f(x)$ at the point $(1, 5)$. If Newton's method is used to locate a root of the equation $f(x) = 0$, and the initial approximation is $x_1 = 1$, find the second approximation x_2 .

$$0 = 6x - 1 \Rightarrow x = 1/6$$

11 pts