4. [8 points] In this problem, you should **show your work**. All your answers should be **exact**, and must be found *algebraically*. Write your final answers *in the spaces provided*.

For parts (a) and (b), consider the function

$$F(x) = \frac{(100x^2 + 3)(x^2 + 2x - 1)}{(x^2 - 2x - 3)(2x^2 + 4)}$$

a. [2 points] Find the horizontal intercept(s) of $y = F(x)$. If the function has no horizontal intercepts, write NONE in the space provided.

Horizontal intercept(s): _____

b. [2 points] Find the equation(s) of the horizontal asymptote(s) of $y = F(x)$. If the function has no horizontal asymptotes, write NONE in the space provided.

Horizontal asymptote(s): _____

c. [4 points] Consider the function

$$G(x) = \frac{x^2(x^2 + 5)^3}{(x - 2)(x^2 + 5)^4 x}$$

Find the equation(s) of the vertical asymptote(s) of $y = G(x)$, and the x-coordinate(s) of the hole(s) of $y = G(x)$. If the function has no vertical asymptotes or has no holes, write NONE in the relevant space.

Vertical asymptote(s): _____

Hole(s): _____