2. [11 points]

    a. [2 points] Let $f(x) = \dfrac{3x^2}{10x^2 + x + 1} + 5$. Find the equation of the horizontal asymptote of the graph of $f(x)$. If the graph has no horizontal asymptote, write "None".

> *Solution:* Horizontal asymptote: $y = 5.3$.

    b. [2 points] For which of the following values of x is the function $f(x) = \sin(x)$ invertible? Circle all that apply.

> *Solution:* $\boxed{\dfrac{\pi}{2} \le x \le \dfrac{3\pi}{2}}$ $0 \le x \le \pi$ $\boxed{-\dfrac{\pi}{2} \le x \le \dfrac{\pi}{2}}$ $0 \le x \le 2\pi$ None
> of these.

    c. [3 points] Find the equations of the vertical asymptotes and the x coordinate(s) of the hole(s) of the function $f(x) = \dfrac{(x-2)(x-3)}{2x^2 - 5x + 2}$.

    Write "None" if the graph of this function does not have a hole or a vertical asymptote. Show all your work.

> *Solution:* The zeros in the denominator can be found by solving $2x^2 - 5x + 2 = 0$. Using quadratic formula
> $$x = \frac{5 \pm \sqrt{25 - 4(2)(2)}}{4} \qquad x = 2, 0.5.$$
> Vertical asymptotes: $x = 0.5$ Holes: $x = 2$.

    d. [4 points] Fill in the blanks:

        i) Let $r(x) = (x^4 - 5)^4$. If with $r(x) = H(G(x))$ with $H(x) = x^4$, then

        $G(x) =$

        ii) Let $k(x) = 2e^{2x+1}$. If $k(x) = F(2x)$ then $F(x) =$_____.

> *Solution:* $G(x) = x^4 - 5$ and $F(x) = 2e^{x+1}$