1.) (9 pts.) The function $f(x) = \dfrac{3}{4-5x}$ is one-to-one. Find its inverse function, $f^{-1}(x)$.

$$Y = \frac{3}{4-5X} \quad \text{(switch X and Y)} \rightarrow$$

$$X = \frac{3}{4-5Y} \quad \text{(solve for y)} \rightarrow$$

$$X(4-5Y) = 3 \rightarrow 4X - 5XY = 3 \rightarrow$$

$$5XY = 4X - 3 \rightarrow Y = \frac{4X-3}{5X} = f^{-1}(x)$$

2.) (7 pts. each) Determine the following limits.

a.) $\displaystyle\lim_{x\to 2} \frac{x^2+x-6}{x^2-4} \overset{\text{"}\frac{0}{0}\text{"}}{=} \lim_{X\to 2} \frac{\cancel{(X-2)}(X+3)}{\cancel{(X-2)}(X+2)} = \frac{5}{4}$

b.) $\displaystyle\lim_{x\to -3} \frac{\frac{1}{x}+\frac{1}{3}}{x+3} \overset{\text{"}\frac{0}{0}\text{"}}{=} \lim_{X\to -3} \frac{\frac{3+X}{3X}}{\frac{X+3}{1}} = \lim_{X\to -3} \frac{\cancel{X+3}}{3X} \cdot \frac{1}{\cancel{X+3}}$

$$= \frac{-1}{9}$$

c.) $\displaystyle\lim_{x\to 1^+} \frac{x^2+3}{1-x} = \text{"}\frac{4}{0^-}\text{"} = -\infty$