8. [11 points]

a. [6 points] Find the following limits. They will either be a real number, ∞, or $-\infty$. *You don't need to show work but partial credit may be awarded for work shown.*

(i)
$$\lim_{x\to-\infty} \frac{x^3+x^2+100}{3x^2-x} = \underline{\quad -\infty \quad}$$

(ii)
$$\lim_{x\to\infty} \frac{(7x-2)^2(x+3)}{5x^3+1} = \underline{\quad 49/5 \quad}$$

(iii)
$$\lim_{x\to\infty} \frac{e^x-x^4}{-(10^x)+x^2} = \underline{\quad 0 \quad}$$

b. [5 points] Consider the rational function:

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

Find the following features or write NONE is none exist. *Show all relevant work.*

(i) Coordinates of any hole(s): $\underline{\quad (3, 27/28) \quad}$

(ii) Equations for any horizontal asymptote(s): $\underline{\quad y = 0 \quad}$

(iii) Equations for any vertical asymptotes(s): $\underline{\quad x = -4,\ x = 1 \quad}$