SOLUTION #3 (8 AM)

Solution 1. *If $f(x)$ gets closer and closer to a number L as x gets closer and closer to c from both sides, then L is the limit of $f(x)$ as x approaches c. (2pts)*

Solution 2. (1) $\lim_{x\to 1} \frac{1}{\sqrt{x}} - \frac{1}{x} = \frac{1}{\sqrt{1}} - \frac{1}{1} = 0$ *(2pts)*

(2) $\lim_{x\to\infty} \frac{x(x+1)}{x^2+1} = \lim_{x\to\infty} \frac{\frac{1}{x^2}(x^2+x)}{\frac{1}{x^2}(x^2+1)}$ *(1pt)*

$= \lim_{x\to\infty} \frac{1+\frac{1}{x}}{1+\frac{1}{x^2}}$ *(1pt)*

$= \frac{1+0}{1+0} = 1$ *(1pt)*

(3) $\lim_{x\to\infty} \frac{2-x^3}{x^4+1} = \lim_{x\to\infty} \frac{\frac{1}{x^4}(2-x^3)}{\frac{1}{x^4}(x^4+1)}$ *(1pt)*

$= \lim_{x\to\infty} \frac{\frac{2}{x^4}-\frac{1}{x}}{1+\frac{1}{x^4}}$ *(1pt)*

$= \frac{0+0}{1+0} = 0$ *(1pt)*