Problem 1

i) $\lim\limits_{x \to 0} \dfrac{x^2 - 25}{x^2 - 4x - 5} = \dfrac{-25}{-5} = 5$

ii) $\lim\limits_{x \to \infty} \sqrt[3]{\dfrac{x-3}{5-x}} = \sqrt[3]{\lim\limits_{x \to \infty} \dfrac{x-3}{5-x}} = \sqrt[3]{\lim\limits_{x \to \infty} \dfrac{1 - \frac{3}{x}}{\frac{5}{x} - 1}}$

$= \sqrt[3]{-1} = -1$

iii) $\lim\limits_{x \to -2} \dfrac{x^4 + 5x^3 + 6x^2}{x^2(x+1) - 4(x+1)}$

$= \lim\limits_{x \to -2} \dfrac{x^2(x+2)(x+3)}{(x+1)(x+2)(x-2)} = \lim\limits_{x \to -2} \dfrac{x^2(x+3)}{(x+1)(x-2)} = \dfrac{4(1)}{(-1)(-4)} = 1$

Problem 2

i) $f(1) = $ doesn't exist

ii) $\lim\limits_{x \to 0} f(x) = \lim\limits_{x \to 0} \sin(\pi x) = 0$

iii) $\lim\limits_{x \to 1} f(x) \Rightarrow \lim\limits_{x \to 1^-} f(x) = 0 \qquad \lim\limits_{x \to 1^+} f(x) = 2$

$\lim\limits_{x \to 1} f(x) \to$ does not exist.

Problem 3

i) does not exist

ii) $f(x) = 3(2) - 2 = 4$

iii) $f(\frac{3}{2}) = \dfrac{\frac{3}{2} + 6}{(\frac{3}{2})^2 - \frac{3}{2}} = \dfrac{\frac{15}{2}}{\frac{3}{4}} = \dfrac{15}{3} \cdot \dfrac{4}{3} = \dfrac{60}{9} = \dfrac{20}{3}$

iv) $\lim\limits_{x \to -2} f(x) \Rightarrow \lim\limits_{x \to -2^-} t^2 = 4 \qquad \lim\limits_{x \to -2^+} \to$ does not exis

v) $\lim\limits_{x \to 1^+} = \infty$ (vi) $\lim\limits_{x \to 2} f(x) = 4$