Limits

2.1.1

(a) 4 , (b) 4 , (c) $\frac{4}{3}$, (d) 2 , (e) 4

(f) NO LIMIT since $\lim\limits_{x \to 2^-} f(x) \neq \lim\limits_{x \to 2^+} f(x)$

2.1.2

$\lim\limits_{x \to -2} \dfrac{(x+2)(x^2 - 2x + 4)}{x + 2} = \lim\limits_{x \to -2} (x^2 - 2x + 4) = 12$

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

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

$\lim\limits_{x \to 3} \dfrac{3 - x}{3x(x-3)} = \lim\limits_{x \to 3} \dfrac{-1}{3x} = -\dfrac{1}{9}$

2.1.3

(a) $\lim\limits_{x \to 2^-} \left[-(x-1)^2\right] = -1$ (b) $\lim\limits_{x \to 2^+} (1-x) = -1$

(c) $\lim\limits_{x \to 2} f(2) = -1$ since $\lim\limits_{x \to 2^-} f(x) = -1 = \lim\limits_{x \to 2^+} f(x)$

2.1.4

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

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

(c) Does not exist since $\lim\limits_{x \to 2^-} m(x) \neq \lim\limits_{x \to 2^+} m(x)$.