1.

$(1, 0.88)$ and $(8, 11.68)$ $\dfrac{11.68 - 0.88}{7} = \dfrac{10.8}{7}$

a. $m = \dfrac{10.8}{7}$ Calculator: Casio fx-9750GII

$(2, 1.96), (3, 3.24)$ $\dfrac{3.24 - 1.96}{1} = 1.28/1$

$(8, 11.68), (9, 13.32)$ $\dfrac{13.32 - 11.68}{1} = 1.64/1$

b. $[8, 9]$

c. we use secant lines close to the tangent we want to find to calculat instantaneous rate of change.

$(6, 8.13), (7, 9.92)$ $\dfrac{9.92 - 8.13}{1} = 1.79/1$

d. $m = 1.79$

2. $\dfrac{\sqrt{x+7} - 2}{x+3} \left(\dfrac{\sqrt{x+7} - 2}{\sqrt{x+7} - 2} \right)$ $x + 7 + 4 \to \underline{x + 13}$

$\dfrac{x+13}{(x+3)(\sqrt{x+7} - 2) \Rightarrow x\sqrt{x+7} + 3\sqrt{x+7} - 2x - 6}$

$\dfrac{\sqrt{x+7} - 2}{x+3} \cdot \dfrac{x-3}{x-3}$

$\dfrac{(-3)+13}{-3\sqrt{(3)+7} + 3\sqrt{(-3)+7} - 2(-3) - 6}$

$-6 + 6 + 6 - 6$

$\dfrac{-x\sqrt{x+7} - 2}{x+3}$ $\dfrac{\sqrt{x} + \sqrt{7} - 2}{x+3} \cdot \dfrac{1/x}{1/x} = \dfrac{\frac{\sqrt{x}}{x} + \frac{\sqrt{7}}{x} - \frac{2}{x}}{1+3} = \dfrac{0}{4}$

$\dfrac{\sqrt{-3}}{-3} + \dfrac{\sqrt{7}}{-3} + \dfrac{2}{3}$

$\dfrac{x+13}{\sqrt{x+7} + 4}$

$(x+3)(\sqrt{x-7} + 2)$

$\dfrac{4x+1}{2x-1} \cdot \dfrac{1/x}{1/x} = \dfrac{4 + \frac{1}{x}}{2 - \frac{1}{x}} \cdot \dfrac{2x+1}{2x+1} = \dfrac{8x^2 + 4x + 2x + 1}{4x^2 - 1}$

$\dfrac{\sqrt{3x^4 + 2x^2 - 1}}{2x^2 + x} \to \dfrac{(3x^2 + 1)(x - 1)}{x(2x+1)} \quad \dfrac{1/x^2}{1/x^2} \to \dfrac{\frac{\sqrt{3x^4}}{x^2} + \frac{\sqrt{2x^2}}{x^2} - \frac{1}{x^2}}{2 + \frac{1}{x}}$

$\dfrac{\sqrt{(3x^2+1)(3x^2-1)}}{x(2x+1)}$

3. a. 1

b. 5 $\quad 2 \to -3$

c. -6 $\quad 2 \cdot 3$

d. -10 $\quad 5 \cdot 2$

e. -1 $\quad 1 + 2$

f. $3\sqrt{-2}$ $\quad -3$

g. 4 $\quad \sqrt[3]{-2}$

4.

a. $[6, 1]$ $(2)^2 + 2 = 6$ $2/2 = 1$

b. no, jump discontinuity at $t = 2$ $\lim\limits_{x \to 2^-} \neq \lim\limits_{x \to 2^+}$

c. $[2, 2]$ $4/2 = 2$ $2(4) - 6 = 2$

d. yes, $\lim\limits_{x \to 4^-} = \lim\limits_{x \to 4^+}$

5.