PART C

1. (a) $$m_t = \lim_{h \to 0} \frac{\left(\sqrt{2(x+h)-1} - \sqrt{2x-1}\right)\left(\sqrt{2(x+h)-1} + \sqrt{2x-1}\right)}{h\left(\sqrt{2(x+h)-1} + \sqrt{2x-1}\right)}$$

$$= \lim_{h \to 0} \frac{2(x+h)-1-(2x-1)}{h\left(\sqrt{2(x+h)-1} + \sqrt{2x-1}\right)}$$

$$= \lim_{h \to 0} \frac{2h}{h\left(\sqrt{2(x+h)-1} + \sqrt{2x-1}\right)}$$

$$= \frac{2}{\sqrt{2x-1} + \sqrt{2x-1}}$$

$$m_t = \frac{2}{2\sqrt{2x-1}}$$

$$m_t = \frac{1}{\sqrt{2x-1}}$$

a) at $x = 5$

$$m_t = \frac{1}{3}$$

b)
$$m_n = -\frac{3}{1}$$

c) Equation

$$\frac{1}{3} = \frac{y-3}{x-5}$$

$$x - 5 = 3y - 9$$

$$x - 3y + 4 = 0$$

Solutions

PART C

1 ii) $$m_T = \lim_{h \to 0} \frac{\frac{2}{2(x+h)+1} - \frac{2}{2x+1}}{h}$$

$$m_t = \lim_{h \to 0} \frac{2(2x+1) - 2\left[(2(x+h)+1)\right]}{(2(x+h)+1)(2x+1)} \Big/ h$$

$$m_t = \lim_{h \to 0} \frac{4x+2-2(2x+2h+1)}{h(2(x+h)+1)(2x+1)}$$

$$m_t = \lim_{h \to 0} \frac{-4k}{h(2(x+h)+1)(2x+1)}$$

$$m_t = \frac{-4}{(2x+1)(2x+1)}$$

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

at $x = -1$

a) $$m_t = \frac{-4}{1}$$

b) $$m_N = +\frac{1}{4}$$

c) Equation

$$\frac{-4}{1} = \frac{y+2}{x+1}$$

$$-4x - 4 = y + 2$$

Part C Solutions Review

2 g)

$$f'(x) = \frac{11(9x^2 - x + 3) - (18x - 1)(11x - 7)}{(9x^2 - x - 3)^2}$$

$$f'(x) = \frac{99x^2 - 11x + 33 - (198x^2 + 126x - 11x - 7)}{(9x^2 - x - 3)^2}$$

$$\boxed{f'(x) = \frac{-99x^2 + 126x - 26}{(9x^2 - x - 3)^2}}$$

h) $f'(x) = 7(12x^2 + 5)^6 (24x)$

$$\boxed{f'(x) = 168x(12x^2 + 5)^6}$$

i) $g(x) = 3(13x^2 - 4x)^{1/3}$

$$g'(x) = 1(13x^2 - 4x)^{-2/3}(26x - 4)$$

$$\boxed{g'(x) = \frac{26x - 4}{(13x^2 - 4x)^{2/3}}}$$