125 HW #12

4.8 #29

4.9 4, 5, 19, 54

4.8 #29

$f(x) = x^3 - 3x + 6$ $\quad x_1 = 1$

$f'(x) = 3x^2 - 3$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$, but $f'(x_1) = f'(1) = 0$,

So x_2 DNE.

4.9 #4

$f(x) = 8x^9 - 3x^6 + 12x^3$

$$\int f(x)dx = \int 8x^9 - 3x^6 + 12x^3\, dx = \frac{8}{10}x^{10} - \frac{3}{7}x^7 + \frac{12}{4}x^4 + C$$

$$= \frac{4}{5}x^{10} - \frac{3}{7}x^7 + 3x^4 + C$$

4.9 #5

$$\int (x+1)(2x-1)\, dx = \int 2x^2 + x - 1\, dx = \frac{2}{3}x^3 + \frac{x^2}{2} - x + C$$

4.9 #19

$$\int 5x^4 - 2x^5\, dx = x^5 - \frac{2}{6}x^6 + C = F(x)$$

$F(0) = 4 \rightarrow 4 = 0^5 - \frac{2}{6}0^6 + C$

$C = 4$

$F(x) = x^5 - \frac{1}{3}x^6 + 4$

4.9 #54

$a(t) = \cos t + \sin t$

$v(t) = \sin t - \cos t + C$

$v(0) = 5 \rightarrow \quad 5 = \cancel{\sin 0} - \cos 0 + C$

$C = 6$

$v(t) = \sin t - \cos t + 6$

$s(t) = \int v(t)\,dt = -\cos t - \sin t + 6t + C$

$s(0) = 0 \rightarrow \quad 0 = -\cos 0 - \cancel{\sin 0} + 6 \cdot 0 + C$

$C = 1$

So $\underline{s(t) = -\cos t - \sin t + 6t + 1}$