E-1

a) $(x^{10}+3x^5+2x^3+4)' = 10x^9+15x^4+6x^2$

c) $(x(2+\pi^3)' = 1$ $\quad \frac{1}{7}x^7+\frac{5}{6}x^6+x^4+C$

2b) $(x^6+5x^5+4x^3)' = 6x^5+25x^4+12x^2$

3 $y' = 3x^2+2x-1$

$y'=0 \quad x = \frac{-2\pm\sqrt{4+12}}{6} = \frac{-2\pm4}{6} = -1 \text{ or } \frac{1}{3}$

$y|_{x=-1} = -1+1+1+2 = 3$

$y|_{x=\frac{1}{3}} = \frac{1}{27}+\frac{1}{9}\cdot-\frac{1}{3}+2 = \frac{1}{27}+\frac{3}{27}-\frac{9}{27}+\frac{54}{27}$

$= \frac{49}{27}$

$\therefore (-1,3)$ & $(\frac{1}{3}, \frac{49}{27})$

4 a) $f(x) = 2x^4+12x^3+14x+8 \quad x>0$

$\lim_{x\to0} f'(x) = 8$

$f(0) = 8$

$f(x) = 2ax+b \quad f'(0)=8$

$b=8.$

$a\in\mathbb{R} \quad b=8$

5. a) $\left(\frac{x}{1+x}\right)' = \frac{1(1+x)-x(1)}{x^2+2x+1} = \frac{1}{x^2+2x+1}$

N-1 e) $\frac{d}{dx}\frac{\sin x}{x} = \frac{\cos x\cdot x-\sin x}{x^2} =$

2 $\lim_{x\to\frac{\pi}{2}} \frac{-\sin x}{1} =$

$\lim_{x\to\frac{\pi}{2}} \frac{\cos x}{x-\frac{\pi}{2}} = \lim_{x\to\frac{\pi}{2}} \frac{\cos x-\cos(\pi/2)}{x-\frac{\pi}{2}} = \frac{d}{dx}\cos x\Big|_{x=} = -1$