8 Oct 2009

72) $f(x) = 2(\sin x + \cos x)$ $\qquad a = 0$

$P_1(x) = f(a) + f'(a)(x-a)$

$P_2(x) = f(a) + f'(a)(x-a) + \frac{1}{2} f''(a)(x-a)^2$

$f(0) = 2(0+1) = 2$

$f'(x) = 2(\cos x - \sin x)$

$f'(0) = 2(1-0) = 2$

$f''(x) = 2(-\sin x - \cos x)$

$f''(0) = 2(0-1) = -2$

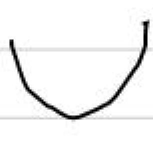
$P_1(x) = 2 + 2(x-0) +$

$P_1(x) = 2 + 2x$

$P_2(x) = 2 + 2x + \frac{1}{2}(-2)(x)^2$

$P_2(x) = 2 + 2x - x^2$

48) f)



69 c) $S = \frac{5000t^2}{8+t^2}$ $\quad 0 \le t \le 3$

$$S' = \frac{10{,}000t(8+t^2) - 2t(5000t^2)}{(8+t^2)^2}$$

$$R = S' = \frac{80{,}000t}{(8+t^2)^2}$$

$$R' = S'' = \frac{80{,}000(8+t^2)^2 - 2(8+t^2)(2t)\,80{,}000t}{(8+t^2)^4}$$

$$\frac{80{,}000(8+t^2)(8+t^2-4t^2)}{(8+t^2)^4}$$

$$\frac{(8+t^2)(8-3t^2)}{(8+t^2)^3}$$

t	0		$\frac{2\sqrt{2}}{\sqrt{3}}$		3
$8+t^2$		$+ + +$		$+ + +$	
$2\sqrt{2}-\sqrt{3}t$		$+ + +$	0	$- - -$	
$2\sqrt{2}+\sqrt{3}t$		$+ + +$		$+ + +$	
$(8+t^2)^4$		$+ + +$		$+ + +$	
R'		$+ + + +$	0	$- - - -$	

$$\frac{2\sqrt{2}}{\sqrt{3}}$$

$\lim_{x \to \infty} f(x) = L$ if f is defined for all x on some interval x>a and for any

E>0 there exists an M > 0 such that |f(x)-L| < E whenever x ≥ M

$\lim_{x \to -\infty} f(x) = L$ iff f is defined for all x < a and for and E>0 there exists an N <0 such that |f(x)-L| < E whenever x < N

Definition of horizontal asymptote
if lim as x approaches infinity or negative infinity is L then y = L is an horizontal asymptote