

Maclaurin Series

Find the terms up to and including x^4 of the Maclaurin series for each of these functions.

$$f(x) = f(0) + \frac{f'(0)}{1!}x + \frac{f''(0)}{2!}x^2 + \frac{f'''(0)}{3!}x^3 + \dots + \frac{f^n(0)}{n!}x^n$$

(a)

$$f(x) = \cos(2x)$$

$f(x)$	$\cos(2x)$	$f(0)$	1
$f'(x)$	$-2 \sin(2x)$	$f'(0)$	0
$f''(x)$	$-4 \cos(2x)$	$f''(0)$	
$f'''(x)$		$f'''(0)$	
$f^4(x)$		$f^4(0)$	

(b)

$$f(x) = e^{-5x}$$

$f(x)$		$f(0)$	
$f'(x)$		$f'(0)$	
$f''(x)$		$f''(0)$	
$f'''(x)$		$f'''(0)$	
$f^4(x)$		$f^4(0)$	

(c)

$$f(x) = \sin\left(-\frac{1}{2}x\right)$$

$f(x)$		$f(0)$	
$f'(x)$		$f'(0)$	
$f''(x)$		$f''(0)$	
$f'''(x)$		$f'''(0)$	
$f^4(x)$		$f^4(0)$	

(d)

$$f(x) = \ln(1 + 4x)$$

$f(x)$		$f(0)$	
$f'(x)$		$f'(0)$	
$f''(x)$		$f''(0)$	
$f'''(x)$		$f'''(0)$	
$f^4(x)$		$f^4(0)$	