

Name: Key
 November 18, 2014
 MAC 2312.0703
 Cyr

Quiz 8

You must show all work to receive full credit!!

Problem 1. (2.5 pts) Find the Taylor series for $f(x) = \frac{6}{x}$ centered at $c = -4$.

n	$f^{(n)}(x)$	$f^{(n)}(-4)$
0	$6x^{-1}$	$-3/2$
1	$-6x^{-2}$	$-3/8$
2	$12x^{-3}$	$-3/16$
$\vdots$	$\vdots$	$\vdots$
n	$\frac{(-1)^n 6 n!}{x^{n+1}}$	$\frac{(-1)^n 6 n!}{(-4)^{n+1}}$

$$c_n = \frac{f^{(n)}(-4)}{n!} = \frac{(-1)^n 6 n!}{(-1)^{n+1} 4^{n+1} n!} = \frac{-6}{4^{n+1}}$$

$$f(x) = \sum_{n=0}^{\infty} \frac{-6}{4^{n+1}} (x+4)^n$$

$$(\text{or } f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n 6}{(-4)^{n+1}} (x+4)^n)$$

Problem 2. (2.5 pts) Find an equation of the tangent line to $x = t^4 + 2$, $y = t^3 + t$ at the point corresponding to $t = 1$.

$$\frac{dy}{dx} = \frac{dy/dt}{dx/dt} = \frac{3t^2 + 1}{4t^3} \bigg|_{t=1} = \frac{4}{4} = 1$$

At $t=1$, $x = 1+2 = 3$, $y = 1+1 = 2$, so

$$y - 2 = 1(x - 3) \Rightarrow \boxed{y = x - 1}$$