



Ma1023
Quiz 5 B

Calculus III

A Term, 2013

Print Name: _____

1. (2 pts) Let $f(x)$ be a function and let $P_5(x)$ be the 5'th Taylor polynomial centered at a .

Which of the following measures the error in the approximation $f(x_0) \approx P_5(x_0)$.

- a) $|R_5(a)|$ b) $|R_4(x_0 - a)|$
☒ c) $|R_5(x_0)|$ d) $|R_4(x_0)|$

2. (2 pts)

Which of the following functions has Taylor Series $\sum_{k=0}^{\infty} (-1)^k \frac{2^{2k+2} x^{2k}}{(2k)!}$

- a) $\cos(x)$ b) $\cos(2x)$
c) $\cos(4x)$ d) $2 \cos(2x)$ ☒ e) $4 \cos(2x)$

3. (4 pts) Find the second Taylor Polynomial $P_2(x)$ for the function $f(x) = \sqrt{x}$ centered at $a = 10$.

$f(x) = (x)^{1/2}$ $f(10) = \sqrt{10}$
 $f'(x) = \frac{1}{2}(x)^{-1/2}$ $f'(10) = \frac{1}{2\sqrt{10}}$
 $f''(x) = -\frac{1}{4}(x)^{-3/2}$ $f''(10) = -\frac{1}{40\sqrt{10}}$
 $P_2(x) = \sqrt{10} + \frac{(x-10)}{2\sqrt{10}} - \frac{(x-10)^2}{40\sqrt{10}}$
 $P_2(x) = \sqrt{10} + \frac{(x-10)}{2\sqrt{10}} - \frac{(x-10)^2}{40\sqrt{10}}$

Thanks to Sonia Zarate.

4. (2 pts) Give the remainder for the approximation in Problem 2 for $\sqrt{110}$.

$R_P(x) = \frac{3(x-10)^3}{8\sqrt{x^5} (3!)} \text{ for } x \text{ between } 10 \text{ and } x$
 $R_P(110) = \frac{3(110-10)^3}{8\sqrt{110^5} (3!)} = \frac{3000000}{8\sqrt{110^5} (3!)} = \frac{62500}{\sqrt{110}} \text{ for } x \text{ between } 10 \text{ and } 110$

Thanks to Lily Ouellette.