Due at the beginning of class on the day of Test 3

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet.Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Find Maclaurin polynomials

Find the nth **Maclaurin** polynomial for the function.

1. $f(x) = e^{4x}$, $T_4(x) = ?$
2. $f(x) = xe^x$, $T_4(x) = ?$
3. $f(x) = \cos(\pi x)$, $T_4(x) = ?$

Problem 2: Find Taylor polynomials

Find the nth Taylor polynomial centered at c.

1. $f(x) = \sqrt{x}$, $c = 4$ $T_3(x) = ?$
2. $f(x) = \ln(x)$, $c = 2$, $T_4(x) = ?$
3. $f(x) = x^2 \cos(x)$, $c = \pi$ $T_2(x) = ?$

Problem 3: Estimate a function value

Use the Taylor (or Maclaurin) poynomial found in the previous Problems to estimate the function value.

1. $f(x) = e^{4x}$, estimate $f\left(\frac{1}{4}\right)$
2. $f(x) = \ln x$, estimate $f(2.1)$

Problem 4: Remainder Estimate

Use Taylor's theorem to find an upper bound for the error of the approximation.

1. $T_3(0.3)$ for $f(x) = \sin x$ is used to estimate $\sin(0.3)$
2. $T_3(0.4)$ for $f(x) = \arctan x$ is used to estimate $\arctan(0.4)$