Due at the beginning of class on the day of Test 1

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: Apply the integration by parts formula

Find the given integral

1. $\int xe^{4x}dx$
2. $\int_0^{\pi/4} x\cos(2x)dx$
3. $\int_1^3 x^3\ln(x)dx$
4. $\int x\tan^2(x)dx$

Problem 2: Integrand with a single term

Find the given integral

1. $\int \arctan(4x)dx$
2. $\int_0^1 \ln(4+x^2)dx$

Problem 3: Using integration by parts repeatedly

Find the given integral

1. $\int e^{4x}\cos(2x)dx$
2. $\int_1^2 x^4(\ln(x))^2dx$

Problem 4: The tabular method

Use the tabular method to find the given integral

1. $\int (x+2)^2\sin(x)dx$
2. $\int x^4e^{-x}dx$

Problem 5: The reduction formula

Use the reduction formula to find the given integral

1. $\int \cos^2(x)dx$
2. $\int \cos^4(x)dx$

Problem 6: Application - finding volume

Find the volume of the solid formed by revolving the region bounded by the curves $y=\ln(x)$, $y=0$ and $x=2$ about:

1. the y-axis
2. the x-axis

Problem 7: An important integral

Show that for a positive integer n

$$\int_{-\pi}^{\pi} x\sin(nx)dx = \begin{cases} \frac{2\pi}{n}, & \text{if } n \text{ is odd} \\ -\frac{2\pi}{n}, & \text{if } n \text{ is even} \end{cases}$$