Please make groups of 3-4 people. Your group may start anywhere on the worksheet you like and do as many problems as you can. It’s okay if you don’t finish the worksheet. Raise your hand if you have a question and please don’t be afraid to ask questions! We learn by asking questions! Everyone should turn in a separate sheet for their work with their name and the names of the people in their group.

1. Compute each of the following integrals:
   (a) \( \int \theta \cos(\pi \theta) \, d\theta \)
   (b) \( \int x^3 \ln x \, dx \)
   (c) \( \int (r^2 + r + 1)e^r \, dr \)

2. Find the area of the region enclosed by the curve \( y = x \cos x \) and the \( x \)-axis (see the accompanying figure) for
   (a) \( \pi/2 \leq x \leq 3\pi/2 \)
   (b) \( 3\pi/2 \leq x \leq 5\pi/2 \)
   (c) \( 5\pi/2 \leq x \leq 7\pi/2 \)
   (d) What pattern do you see? What is the area between the curve and the \( x \)-axis for

\[
\left( \frac{2n - 1}{2} \right) \pi \leq x \leq \left( \frac{2n + 1}{2} \right) \pi,
\]
where \( n \) is an arbitrary integer? Give reasons for your answer.

3. Compute each of the following integrals:
   (a) \( \int \frac{4x}{\cos^2(2x)} \, dx \)
   (b) \( \int \tan^{-1} y \, dy \)

4. Challenge!
   Compute each of the following integrals:
   (a) \( \int \sin(lnx) \, dx \)
   (b) \( \int z(lnz)^2 \, dz \)