Instructions. Put your first and last name at the top of your paper. Everyone is to do their own worksheet but only one from each group is graded with the score shared. Be sure to show your work and explain your reasoning. All worksheets from each group will be collected. This worksheet has two pages

For Problems 1 and 2 (Each worth 3 points):

(a) Find the intervals on which \( f \) is increasing or decreasing using the Increasing/Decreasing Test (page 290).

(b) Find the local maximum and minimum values of \( f \) using either the First Derivative Test (page 291) or the Second Derivative Test (page 295).

(c) Find the intervals of concavity and the inflection points using the Concavity Test (page 293).

1. \( f(x) = \cos^2(x) - 2\sin x \), where \( f(x) \) is restricted to the interval \([0, 2\pi]\).
2. $f(x) = x^4 e^{-x}$
For Problem 3 (worth 4 points):

(a) Find any vertical or horizontal asymptotes of $f$.

(b) Find intervals of increase or decrease using the First Derivative Test (page 291).

(c) Find the local minimum and maximum values.

(d) Find the intervals of concavity and inflection points.

(e) Use the information from parts (a)-(d) to sketch the graph of $f$. Clearly draw any vertical and/or horizontal asymptotes in your graph. Label all the points you found in parts (c) and (d) in your graph.

3. $f(x) = e^{\arctan(x)}$. 