

# PHYS 160 - Homework #1

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*Make sure your name is listed as a comment at the beginning of your worksheet.*

## Basic Plotting:

Make sure that each plot has a title that properly identifies it. Plot all functions over the domain  $x = [-2..2]$

- Plot:  $f1(x) = e^{-0.3x^2} \sin(x)$
- Plot:  $f2(x) = \cos(x) \sin(x)$
- Plot:  $f3(x) = \sin(x) + \cos(x)$
- Plot:  $f4(x) = \sin(x) + \sin(2x)$
- On the same plot, graph  $f1, f2, f3, f4$  simultaneously.
- Find by inspection the intercept of  $f1(x)$  with the x-axis over the interval  $x = [2..4]$ .

## Lists and Sequences

- Create a function  $g(x) = e^{-x^2}$
- List the values of  $g(x)$  at the integer values  $x = [-5, -4, \dots, 4, 5]$
- Print the sum of these numbers, and its decimal equivalent
- Print the product of these numbers, and its decimal equivalent
- Evaluate:  $\sum_{n=1}^{\infty} \frac{1}{n^2}$
- Evaluate this sum to 50 decimal places

## 3D Plots

Make sure that each plot has a title that properly identifies it. Plot all functions over the domain  $x = [-2..2]$  and  $y = [-2..2]$  in a boxed plot.

- Define the function  $r1(x, y) = \sqrt{x^2 + y^2}$
- Define the function  $r2(x, y) = \sqrt{x^2 + y^2} + \sin(x) \cos(2y)$
- Define the function  $g(m) = e^{-m^2}$
- Plot  $g(r1(x, y))$
- Plot  $g(r2(x, y))$

## Problem Solving

- Which of these is greater:  $a = (\frac{3}{4})^{42}$  or  $b = (\frac{7}{8})^{91}$ ? Make sure your answer is well justified.