
4321

1. Consider the function $f(x) = \frac{x}{\pi}$ on the interval $0 \leq x \leq 2\pi$
 - (a) Sketch a graph of the function $f(x)$ versus x , labeling interesting points.
 - (b) Sketch an EVEN periodic function that is identical to the given function $f(x)$ where $f(x)$ has support (where it is nonzero).
 - (c) What is the period of this even function?
 - (d) Sketch an ODD periodic function that is identical to the given function $f(x)$ where $f(x)$ has support.
 - (e) What is the period of this odd function?
 - (f) Which periodic function (even or odd) has a Fourier series approximation which will converge faster to $f(x)$? Why?
 - (g) Find the first five nonzero terms in any Fourier expansion of the function where it has support, not just the coefficients a_n and/or b_n but also the terms with x dependence.
 - (h) Plot using software (not by hand) the original function $f(x)$ and your Fourier approximation to the function. You may use more than five terms if you wish.

7305

1. Consider the first full period of the sine function: $\sin(x)$, $0 < x < 2\pi$.
 - (a) Expand this in a Fourier **cosine** series and list the first four non-zero Fourier coefficients. (This is not a trick question. You can expand any function outside its given range as either an even or an odd function.)
 - (b) Plot using software (not by hand) the original function and your four-term approximation using a computer for the range $0 < x < 2\pi$.
 - (c) Plot using software (not by hand) the original function and your four-term approximation using a computer for the range $-2\pi < x < 0$. Comment.
 - (d) Expand $\sin(x)$, $0 < x < 2\pi$, in a Fourier sine series. Find all the coefficients.

Bonus: Solve as much of the other class' assignment as you can.