## Math 2080: Differential Equations Worksheet 6.2: Computation of Fourier series

## NAME:

Consider the function defined by $f(x)=\left\{\begin{array}{ll}0, & -\pi \leq x<0 \\ x, & 0 \leq x<\pi\end{array}\right.$ and extended to be $2 \pi$-periodic.
(a) Sketch $f(x)$ on at least the interval $[-3 \pi, 3 \pi]$, and find its Fourier coefficients (i.e., $a_{0}, a_{n}$, and $b_{n}$ ).
(b) Write $f(x)$ as a Fourier series: $f(x)=\frac{a_{0}}{2}+\sum_{n=1}^{\infty} a_{n} \cos n x+b_{n} \sin n x$ (i.e., plug the coefficients back in).
(c) Explicitly write out the first few terms $(n=0,1, \ldots, 7)$ of the Fourier series of $f(x)$.

