

HOMework #24 (M427K FALL 2004)

The following “orthogonality relations” are just integrals that we need for Fourier Series. You probably don’t know what Fourier Series are yet, so just verify the following integrals...

1. VERIFY THE INTEGRAL

$$\frac{1}{\pi} \int_{-\pi}^{\pi} \cos(mx) \cos(nx) dx = \begin{cases} 0 & m \neq n \\ 2 & m = n = 0 \\ 1 & m = n > 0 \end{cases}$$

2. VERIFY THE INTEGRAL

$$\frac{1}{\pi} \int_{-\pi}^{\pi} \cos(mx) \sin(nx) dx = 0$$

3. VERIFY THE INTEGRAL

$$\frac{1}{\pi} \int_{-\pi}^{\pi} \sin(mx) \sin(nx) dx = \begin{cases} 0 & m \neq n \\ 0 & m = n = 0 \\ 1 & m = n > 0 \end{cases}$$