$$S(x) = \frac{A_0}{2} + \sum_{n=1}^{\infty} \left(A_n \cos(nx) + B_n \sin(nx) \right)$$

$$A_n = \frac{1}{\pi} \int_0^{2\pi} f(x) \cos(nx)\, dx \qquad B_n = \frac{1}{\pi} \int_0^{2\pi} f(x) \sin(nx)\, dx$$

$f(x) = \sin(3x)$

$$A_0 = \frac{1}{\pi} \int_0^{2\pi} \sin(3x) \cos(\cancel{0x}^{1})\, dx = -\frac{1}{3} + \frac{1}{3} = 0$$

$$A_1 = \frac{1}{\pi} \int_0^{2\pi} \sin(3x) \cos(x)\, dx = 0$$

$$B_1 = \frac{1}{\pi} \int_0^{2\pi} \sin(3x) \sin(x)\, dx = 0$$

$S(x) = 0$ $\qquad n = 0$ to $n = \infty$

<u>2.2</u> $$C_{n,m} = \frac{4V_0}{ab} \int_0^a \sin(n\pi y/a)\, dy \int_0^b \sin(m\pi z/b)\, dz$$

even $2 = m, n$

$$= \frac{4V_0}{ab} \int_0^a \sin(2\pi y/a)\, dy \int_0^b \sin(2\pi z/b)\, dz$$

$$-\frac{\cos(2\pi \cancel{a})^{0} - 1}{\cancel{2}\pi a} \qquad -\frac{\cos(2\pi \cancel{b})^{0} - 1}{\cancel{2}\pi b}$$

if a or b produce an even factor of π $\cos(\sim) - 1$ will be zero

$= 0$

odd m & n

$$-\frac{\cos(\pi a) - 1}{\pi a} \qquad -\frac{\cos(\pi b) - 1}{\pi b}$$

if a or b produce an odd factor of π $\cos(\sim) - 1$ will be -2

$$\frac{4V_0}{ab} \quad \frac{-2}{\pi a} \quad \frac{-2}{\pi b} = \frac{16 V_0}{\pi^2 mn}$$

<u>1.1</u> A $\qquad$ <u>1.2</u> B $\qquad$ <u>2.1</u> B + C