These formula will be available on the third exam. You need to know what they mean and how they are used.

$$u(x,t) = \sum_{n=1}^{\infty} c_n e^{-\beta(n\pi/L)^2 t} \sin \frac{n\pi x}{L}$$

$$u(x,t) = \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi\alpha}{L} t + b_n \sin \frac{n\pi\alpha}{L} t \right) \sin \frac{n\pi x}{L}$$

$$\int u \sin u \, du = \sin u - u \cos u$$

$$\int u \cos u \, du = \cos u + u \sin u$$

$$u(x,t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n e^{-\beta(n\pi/L)^2 t} \cos \frac{n\pi x}{L}$$

$$u(x,t) = \frac{1}{2} \left(f(x + \alpha_t) + f(x - \alpha t) \right) + \frac{1}{2\alpha} \int_{x-\alpha t}^{x+\alpha t} g(s) \, ds$$

$$u(r,\theta) = \frac{a_0}{2} + \sum_{n=1}^{\infty} \left(\frac{r}{a} \right)^n \left(a_n \cos n\theta + b_n \sin n\theta \right)$$

$$\sin^2 x = \frac{1}{2}(1 - \cos 2x), \qquad \cos^2 x = \frac{1}{2}(1 + \cos 2x)$$