ج1:

$$u = X(x)Y(y) \rightarrow u_x = \acute{X}Y, u_y = \acute{Y}X$$

$$\acute{X}Y = 4X\acute{Y} \rightarrow \frac{\acute{X}}{4X} = \frac{\acute{Y}}{Y} \rightarrow u(x,y) = De^{k(4x+y)} \rightarrow$$

$$u(0,y) = De^{ky} = 8e^{-3y} \rightarrow D = 8, k = -3 \rightarrow$$

$$u(x,y) = 8e^{-3(4x+y)}$$

$$f(x) = \begin{cases} e^{-ax}, x > 0 \\ 0, \ x < o \end{cases}, \ a > 0 \qquad\qquad \text{-2}$$

$$F(\alpha) = \int_{-\infty}^{\infty} f(x)e^{-i\alpha x}dx$$

$$= \int_0^{\infty} e^{-(a+i\alpha)x} dx = \frac{1}{a + i\alpha}$$

$$a_0 = \frac{1}{\pi}\int_0^{2\pi} x^2 dx = \frac{8\pi^2}{3} \qquad\qquad \text{ج 2}$$

$$a_n = \frac{1}{\pi}\int_0^{2\pi} x^2 \cos nx \, dx = \frac{4}{n^2}$$

$$b_n = \frac{1}{\pi}\int_0^{2\pi} x^2 \sin nx \, dx = \frac{-4\pi}{n}$$

$$x^2 = \frac{4\pi^2}{3} + \sum_{n=1}^{\infty} \left(\frac{4}{n^2}\cos nx - \frac{-4\pi}{n}\sin nx\right)$$

ج 3 1- أوجد تحويل لابلاس للدوال الأتية

$$L\left\{t^6 - 5e^{2t} + t^{3/2}\right\}, L\{t^3 e^{3t}\}, L\{3\cosh 5t + 4\sinh 5t\}$$

$$L\left\{t^6 - 5e^{2t} + t^{3/2}\right\} = \frac{6!}{s^7} - \frac{5}{s-2} + \frac{3\sqrt{\pi}}{8s^{5/2}}$$

$$L\{t^3 e^{3t}\} = \frac{3!}{(s-3)^4}, L\{3\cosh 5t + 4\sinh 5t\} = \frac{3s}{s^2-25} + \frac{20}{s^2-25}$$

2- تحويل لابلاس العكسي

$$L^{-1}\left\{\frac{5}{s-4} - \frac{3s}{s^2+9} + \frac{5}{s^2+9}\right\} = 5e^{4t} - 3cos3t + \frac{5}{3}sin3t,$$

$$L^{-1}\left\{\frac{3s+7}{s^2-4s+20}\right\} = 3e^{2t}cos4t + \frac{13}{4}e^{2t}sin4t$$

انتهت الإجابة

تمنياتي لكم بالتوفيق

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