

$$1. u = \sum_1^{20} \frac{1}{n^2} e^{-n^2 \pi^2 4t} \sin n\pi x$$

$$2. u = \frac{3}{6^2} = \frac{3}{36} \sum_1^{20} \frac{1}{n^2} e^{-\frac{n^2 \pi^2}{4} t} \sin n\pi x$$

$$3. u = \sum_1^{100} (-1)^n e^{-\frac{n^2 \pi^2 t}{12}} \sin \frac{n\pi x}{6}$$

$$4. u = \sum_1^{500} \frac{1}{n!} e^{-\frac{n^2 \pi^2}{7} t} \sin n\pi x$$

$$5. u = \sum_1^{\infty} \frac{1}{n^n} e^{-28n^2 \pi^2 t} \sin 2n\pi x$$

$$6. f = \sum_1^{\infty} \frac{-8}{((2n-1)\pi)^3} \sin(2n-1)\pi x$$

$$7. f = \sum_1^{\infty} (-1)^{n+1} \frac{16}{\pi^2 (2n-1)^2} \sin \frac{(2n-1)\pi x}{2}$$

$$8. f = \sin 3\pi x$$

$$9. f = \sum_1^{\infty} 4 \left(\frac{4}{n\pi} \right)^2 \left\{ \sin \frac{n\pi}{4} - \sin \frac{3n\pi}{4} \right\} \sin \frac{n\pi x}{4}$$

$$10. u = \sum_1^{\infty} \frac{-8}{((2n-1)\pi)^3} e^{-(2n-1)^2 \pi^2 3t} \sin(2n-1)\pi x$$

$$11. u = \sum_1^{\infty} (-1)^{n+1} \frac{16}{(2n-1)^2 \pi^2} e^{-(2n-1)^2 \pi^2 \frac{t}{28}} \sin \left(\frac{(2n-1)\pi x}{2} \right)$$