

$$(42) \quad y = \cos x \sin x \quad a = \frac{\pi}{4}$$

$$y\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} = \frac{1}{2}$$

$$\frac{dy}{dx} = \cos x (\cos x) - \sin x (\sin x)$$

$$\cos^2 x - \sin^2 x$$

$$\cos^2 \frac{\pi}{4} - \sin^2 \frac{\pi}{4} = 0$$

$$L(x) = \frac{1}{2}$$

$$(48) \quad y = e^{\sqrt{x}} \quad a = 1$$

$$y(1) = e$$

$$\frac{dy}{dx} = e^{\sqrt{x}} \cdot \frac{1}{2} x^{-1/2}$$

$$= \frac{1}{2} e$$

$$y - e = \frac{e}{2} (x - 1)$$

$$L(x) = \frac{e}{2} (x - 1) + e$$

$$(47) \quad y = \sin^{-1} x \quad a = \frac{1}{2}$$

$$y\left(\frac{1}{2}\right) = \sin^{-1} \frac{1}{2} = \pi/6$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}} \rightarrow \frac{1}{\sqrt{1-\left(\frac{1}{2}\right)^2}} \rightarrow \frac{1}{\sqrt{\frac{3}{4}}}$$

$$= \sqrt{\frac{4}{3}} = \frac{2}{\sqrt{3}} \quad y - \frac{\pi}{6} = \frac{2}{\sqrt{3}} \left(x - \frac{1}{2}\right)$$

$$L(x) = \frac{2}{\sqrt{3}} \left(x - \frac{1}{2}\right) + \frac{\pi}{6}$$

$$(a) \quad g(x) = e^{ax} + f(x)$$

$$g'(x) = a e^{ax} + f'(x)$$

$$g'(0) = a e^0 + f'(0) = a - 4$$

$$g''(x) = a^2 e^{ax} + f''(x)$$

$$g''(0) = a^2 e^0 + f''(0) = a^2 + 3$$

$$(b) \quad h(x) = \cos(kx) f(x) \quad h(0) = 2$$

$$h'(x) = -k \sin(kx) f(x) + f'(x) \cos(kx)$$

$$h'(0) = \quad \quad \quad f'(0) \cos(0)$$

$$= -4$$

$$4 - 2 = -4(x)$$