

$$(d) \quad f(t) = 2 \cos t + \sin 2t \quad \text{on } [0, \frac{\pi}{2}]$$

$$\text{Step 1.} \quad a = 0, \quad b = \frac{\pi}{2} \quad (68)$$

$$\begin{aligned} \text{Step 2.} \quad f'(t) &= 2(-\sin t) + \cos(2t) \cdot 2 \\ &= 2 \{ -\sin t + \cos(2t) \} \end{aligned}$$

$$= 2 \{ -\sin t + (1 - 2\sin^2 t) \}$$

$$= -2(2\sin t - 1)(\sin t + 1)$$

$$c = \frac{\pi}{6} \quad (\leftarrow \sin c = \frac{1}{2})$$

Step 3.

$$f(0) = 2 \cos 0 + \sin 2 \cdot 0 = 2$$

$$f\left(\frac{\pi}{2}\right) = 2 \cdot \cos \frac{\pi}{2} + \sin\left(2 \cdot \frac{\pi}{2}\right) = \cancel{2} \cdot 0 \quad \leftarrow \text{abs. min.}$$

$$\begin{aligned} f\left(\frac{\pi}{6}\right) &= 2 \cos \frac{\pi}{6} + \sin\left(2 \cdot \frac{\pi}{6}\right) \\ &= \sqrt{3} + \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{2} \quad \leftarrow \text{abs. max} \end{aligned}$$