19.2 We are asked to determine the temperature to which 10 lb_m of brass initially at 25°C would be raised if 65 Btu of heat is supplied. This is accomplished by utilization of a modified form of Equation 19.1 as

$$\Delta T = \frac{\Delta Q}{m c_p}$$

in which ΔQ is the amount of heat supplied, m is the mass of the specimen, and c_p is the specific heat. From Table 19.1, c_p = 375 J/kg-K for brass, which in Customary U.S. units is just

$$c_p = (375 \text{ J/kg-K})\left(\frac{2.39 \text{ x } 10^{-4} \text{ Btu/lb}_m\text{-°F}}{1 \text{ J/kg-K}}\right) = 0.090 \text{ Btu/lb}_m\text{-°F}$$

Thus

$$\Delta T = \frac{65 \text{ Btu}}{(10 \text{ lb}_m)(0.090 \text{ Btu/lb}_m\text{-°F})} = 72.2°F$$

and

$$T_f = T_0 + \Delta T = 77°F + 72.2°F = 149.2°F \quad (65.1°C)$$