Ley de Stefan-Boltzmann se utiliza para estimar la velocidad de cambio de la energía H para una superficie, esto es

$H = Ae\sigma T^4$

Determine el valor, error de H para una placa de acero con $A = 0.15m^2$, $e = 0.90$, $T = 650 \pm 20K$

Repetir para $T = 650 \pm 40K$

$\sigma = 5.67 \times 10^{-8} W m^2 K^{-4}$

$H = Ae\sigma T^4 = (0.15m^2)(0.9)(5.67 \times 10^{-8} W/m^2K^{-4})(650K)^4 = 7366.38 W$

a) $dH/dT = 4Ae\sigma T^3$

$dH = |4Ae\sigma T^3|\Delta T$ ~~$= |4(0.15m^2)(0.9)(5.67 \times 10^{-8} W/m^2K^{-4})(650^3)|($~~

~~1~~ $\frac{\Delta H}{\Delta T} = 4(0.15m^2)(0.9)(5.67 \times 10^{-8} W/m^2K^{-4})(650K)^3 = 8.91 W/K$

$\Delta H = (8.91)(20) = 168.2 W$

$H_+ = Ae\sigma(T+\Delta T)^4 = 1592.98 W$

$H_- = 1205.81 W \pm 168.2$

~~Error exacto = 1592.98W - 1205.81W~~

b) $\frac{dH}{dT} = 4Ae\sigma T^3 = 8.91 W/K$

$\Delta H = (8.91 W/K)(40K) =$ ~~178.2W~~ 356.4

$H_+ = Ae\sigma(T+\Delta T)^4 = 1735.05 W$

$H_- = 1059.82 W \pm 336.4$