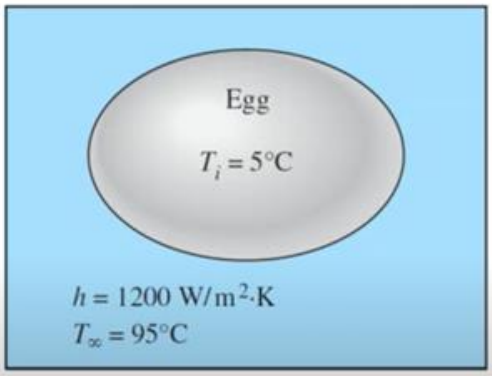
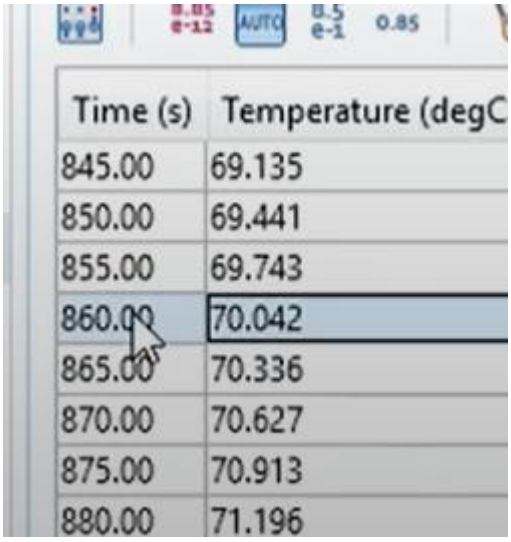
Transient Heat Transfer Demonstration Problem



r = 2.5 cm
k = 0.627 W/m·K
ρ = 993.05 kg/m³
c_p = 4178.5 J/kg·K
T_i = 5 °C
h = 1200 W/m² K

The time at which the center of the egg reaches 70°C.?



Time (s)	Temperature (degC
845.00	69.135
850.00	69.441
855.00	69.743
860.00	70.042
865.00	70.336
870.00	70.627
875.00	70.913
880.00	71.196

Reference: COMSOL Conduction heat transfer - Boiling Eggs, https://www.youtube.com/watch?v=HZtdfpbAz9E

Abaqus solution (axisymmetric transient heat transfer)

Abaqus Consistent Units

Quantity	SI	SI (mm)	US Unit (ft)	US Unit (inch)
Length	m	mm	ft	in
Force	N	N	lbf	lbf
Mass	kg	tonne (10^3 kg)	slug	lbf s^2/in
Time	s	s	s	s
Stress	Pa (N/m^2)	MPa (N/mm^2)	lbf/ft^2	psi (lbf/in^2)
Energy	J	mJ (10^{-3} J)	ft lbf	in lbf
Density	kg/m^3	tonne/mm^3	slug/ft^3	lbf s^2/in^4