

MICHAEL DELARUEZ

MET 440

HW 2.2

3)

$$L = 0.1 \text{ m}$$

$$x = 0$$

$$x = L$$

$$h = 200 \text{ W/m}^2 \cdot ^\circ\text{C}$$

$$k = 10.0 \text{ W/m} \cdot ^\circ\text{C}$$

$$t_0 = 150^\circ\text{C}$$

$$g = 10^5 \text{ W/m}^3$$

$$T(x) = \frac{gL^2}{2k} \left[1 - \left(\frac{x}{L} \right)^2 \right] + \frac{gL}{h} + T_0$$

$$T(x) = 125 (1 - 100x^2) + \frac{10^5}{h} + 150$$

$$x = 0: 125 (1 - 100(0)^2) + \frac{10^5}{200} + 150$$
$$\boxed{775^\circ\text{C}}$$

$$x = L: 125 (1 - 100(0.1)^2) + \frac{10^5}{200} + 150$$
$$\boxed{650^\circ\text{C}}$$

22) $L = 10 \text{ cm}$ $x = 0$

$$T_L = 200^\circ\text{C} \quad x = L$$

$$k = 20 \text{ W/m} \cdot ^\circ\text{C} \quad g = 20000 \text{ W/m}^3$$

$$T(x) = \frac{gL^2}{2k} \left(1 - \left(\frac{x}{L} \right)^2 \right) + T_L$$

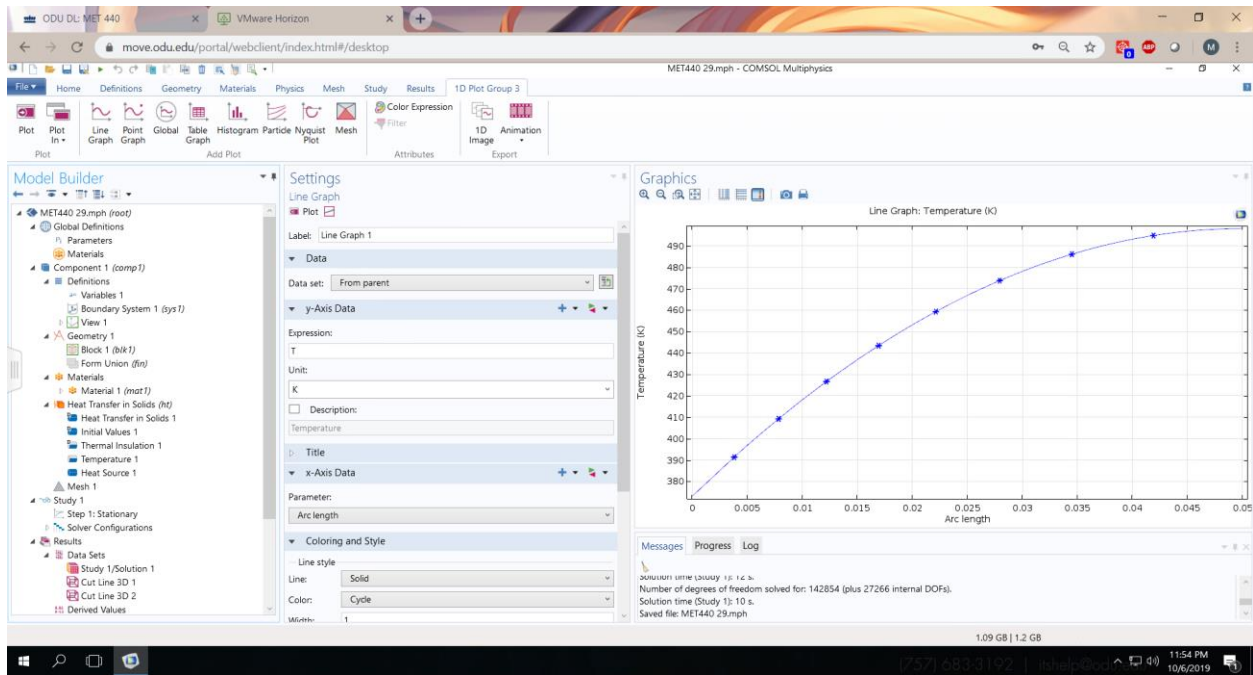
$$= \frac{20,000 (0.1)^2}{2 \times 20} \left(1 - \left(\frac{x}{0.1} \right)^2 \right) + 200$$

$$= 5 (1 - 100x^2) + 200$$

$$x = 0: = 5 (1 - 100(0)^2) + 200 = 205^\circ\text{C}$$

$$x = L = 5 (1 - 100(0.1)^2) + 200 = 200^\circ\text{C}$$

29.



30

