**PHYS 375; PS3**

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**Declaration of Collaboration**

While working on this problem set, I discussed approaches to question 3 with Suhail Chander.

**Question 2**

**Question 3**

3a)

Text, letter

Description automatically generated

3b)

Text, letter

Description automatically generated

3c)

Text, letter

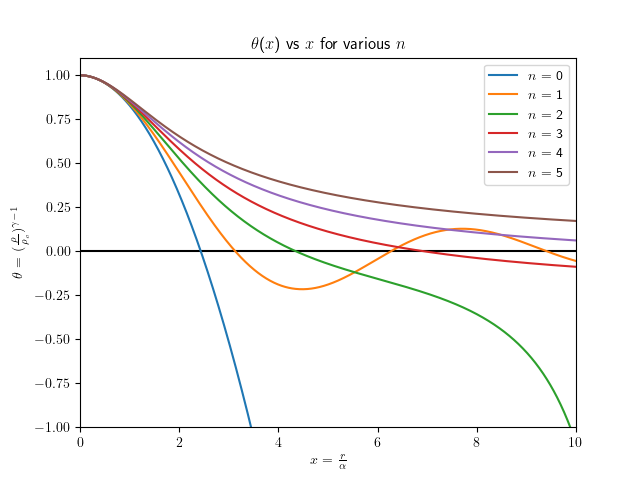
Description automatically generated

3d)

Text, letter

Description automatically generated

3e, f)



Text, letter

Description automatically generated

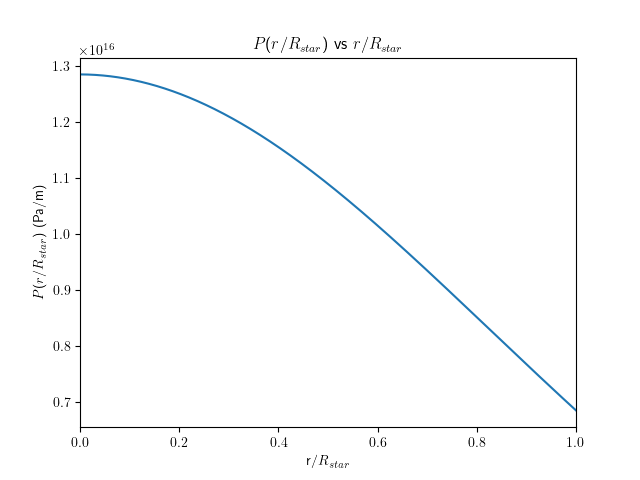
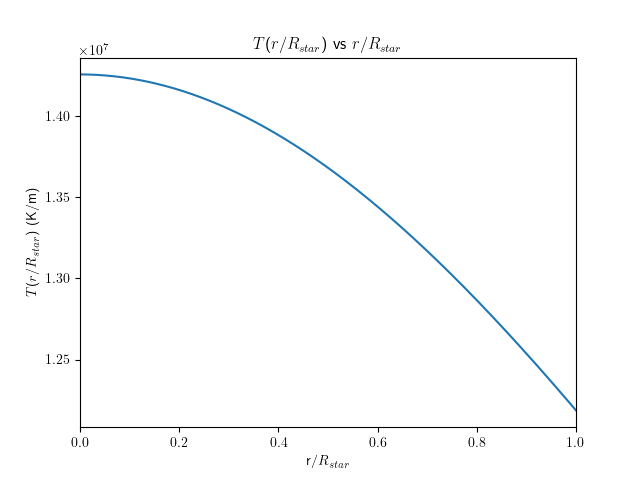
3g) The results for the variables are:

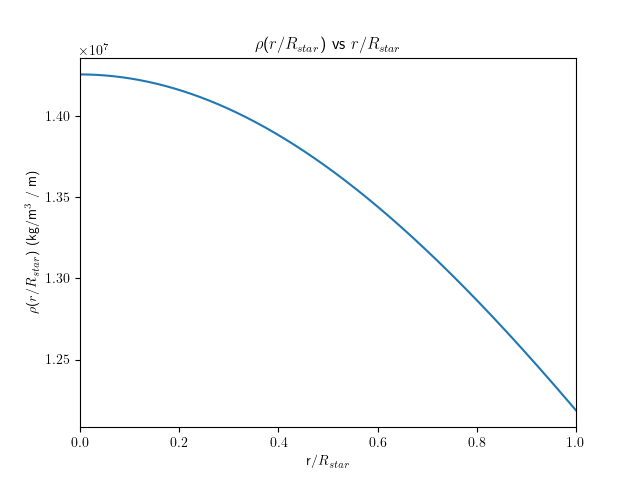
α = 1.00 \* 108 m [assuming that x is dimension-less]

ρc = 7.80 \* 104 kg/m3

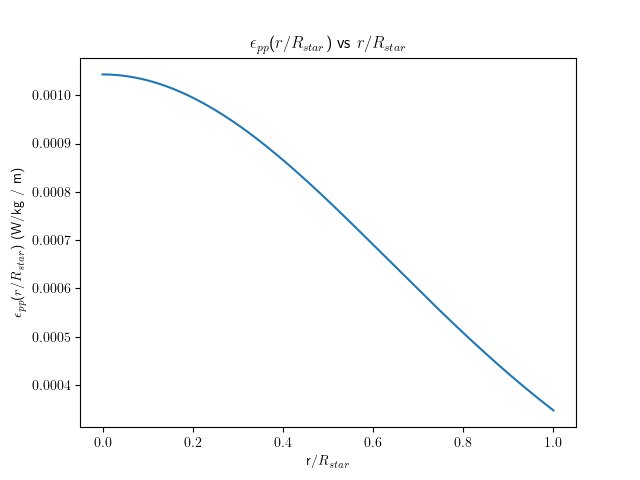
K = 3.86 \* 109 [dimension-less]

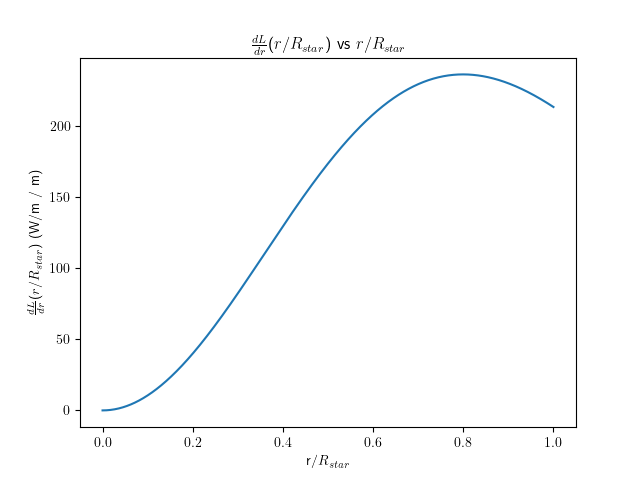
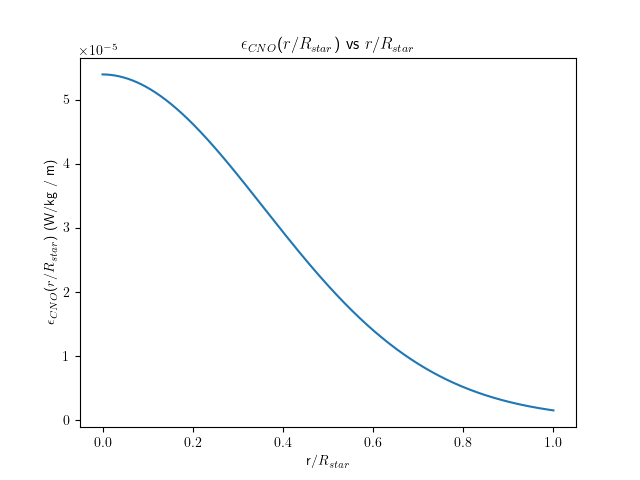
3h)





3i)





The total luminosity of the star is 4.88 \* 1028 W.[[1]](#footnote-1)

3j)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass/Msun | Radius/Rsun | ρc (kg/m3) | Tc (K) | L (W) |
| 1 | 1 | 7.80 \* 104 |  | 4.88 \* 1028 |
| 0.5 | 0.6 | 1.80 \* 105 |  | 2.68 \* 1028 |
| 20 | 10 | 1.56 \* 103 |  | 3.44 \* 1032 |

1. Yes I know this is not in line with the expected 1026 W. [↑](#footnote-ref-1)