Variables:

* Slope\_AB: this will be used to find the slope of a point between points A and B
* Slope\_BC: this will be used to find the slope of a point between points B and C
* Slope\_CD: this will be used to find the slope of a point between points C and D
* Slope\_DE: this will be used to find the slope of a point between points D and E
* Excess: this will be the value they enter for us to use in our calculations
* Surface\_heat: this will be as the final output inside the if else statement

Steps:

* Set out an input for the user to enter the excess heat
  + Excess= float(input(“Enter the excess temperature: “))
* Find slopes for each of the segments
  + Slope\_AB: (log10(7000/1000)) / (log10(5/1.3))
  + Slope\_BC: (log10(1.5E6/7000)) / (log10(30/5))
  + Slope\_CD: (log10(2.5E4/1.5E6)) / (log10(120/30))
  + Slope\_DE: (log10(1.5E6/2.5E4)) / (log10(1200/120))
* Set up the if else statement
  + If (excess>= 1.3 and excess <5)
    - Surface\_heat= 1000 (excess/1.3) ^Slope\_AB
    - Print (“The surface heat flux is approximately”, surface heat)
  + Elif (excess>=5 and excess <30)
    - Surface\_heat= 7000 (excess/5) ^Slope\_BC
    - Print (“The surface heat flux is approximately”, surface heat)
  + Elif (excess>=30 and excess<120)
    - Surface\_heat= 1.5E6 (excess/30) ^Slope\_CD
    - Print (“The surface heat flux is approximately”, surface heat)
  + Elif (excess>=120 and excess <=1200)
    - Surface\_heat= 2.5E4 (excess/120) ^Slope\_DE
    - Print (“The surface heat flux is approximately”, surface heat)
  + Else
    - Print (“Surface heat flux is not available”)

Test Cases:

|  |  |  |
| --- | --- | --- |
| Excess Heat | Surface heat influx | Case type |
| 1.3 | 1000 | Edge |
| 3 | 3347 | Typical |
| 5 | 7000 | Edge |
| 12 | 96392 | Typical |
| 30 | 1.5E6 | Edge |
| 62 | 175775 | Typical |
| -7 | Surface heat influx not available | Special |
| 120 | 2.5E4 | Edge |
| 300 | 127508 | Typical |
| 1200 | 1.5E6 | Edge |