In [17]:
```
import math

height= float(input("How tall(m) is the tower? "))

s=height
g=9.81
time=math.sqrt((2*s)/g)

print("The ball takes",f'{time:.2f}',"seconds to fall.")
```

```
How tall(m) is the tower? 100
The ball takes 4.52 seconds to fall.
```

In [18]:
```
##Part a) of exercise 2.2

import numpy as np

##These are constants
G= 6.67e-11
M=5.97e24
R= 6371e3

##This input asks the user to specify if the period is in seconds
##minutes, or hours
type_t=input("Is your period in s, m, or h? ")

##Converts period into seconds if needed
if type_t == "s":
    T=float(input("Please enter your period. "))

elif type_t == "m":
    T=60*float(input("Please enter your period. "))

else:
    T=3600*float(input("Please enter your period. "))


#Calculates height of sattelite in meters, the print
height=((G*M*T**2/(4*np.pi**2)))**(1/3) - R
print('The height of the satellite is', f'{height:.2f}', 'meters.')
```

```
Is your period in s, m, or h? h
Please enter your period. 23.93
The height of the satellite is 35773762.33 meters.
```

In [21]:
```
##Exercise 2.2 Questions

## c) Altitude at
## 1 day- The height of the satellite is 35855910.18 meters.
## 90 minutes- The height of the satellite is 279321.63 meters.
## 45 minutes- The height of the satellite is -2181559.90 meters.
## Given that the output of the orbit for period T=45 minutes is negative,
## it is not possible to have a satellite with that period T.

## d) A sidereal day is the amount of time it takes for the Earth to complete
## a full 360 degree rotation. The 24 hour time period is a solar day which is
## how long it takes the Earth to rotate until the Sun is a the same place in the
## sky as the day prior. The Earth has to rotate a little more thann 360 degrees
## for this to happen, so there is a slight time difference. It makes a difference of
```

```
dif=35855910.18-35773762.33
print(f'{dif:.2f}')
## approximately 82 kilometers to the altitude of the satellite.
```

```
82147.85
```

In [ ]:

```

```