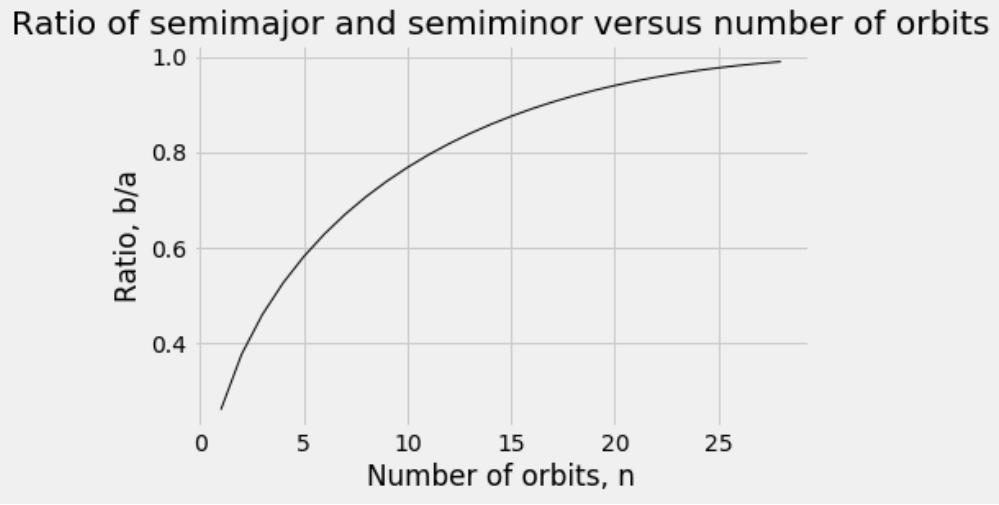
Satellite Orbirt

In [1]:
```
# Importing numpy and matplotlib
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
plt.style.use('fivethirtyeight')
```

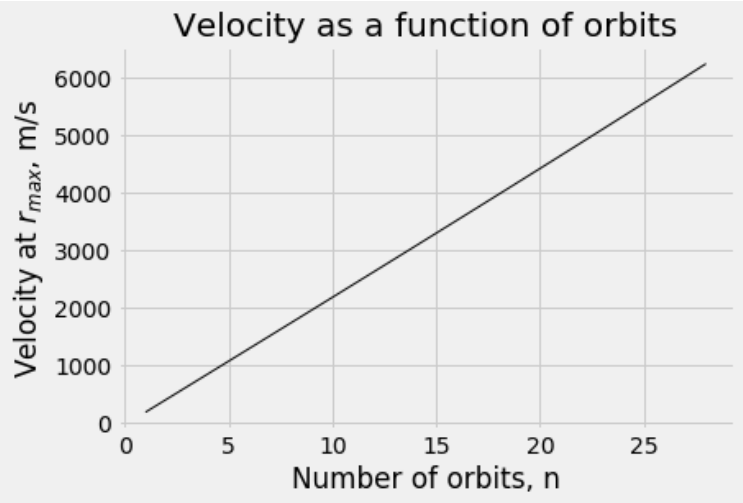
In [3]:
```
filename = 'Ratio_semi_maj_min.dat'

all_datar = np.loadtxt(filename, skiprows=0)
all_datar = all_datar.transpose()

k = all_datar[0]
ratio = all_datar[1]
```

In [4]:
```
# Plot the ratio of semiminor versus semimajor axis versus  number of orbit
s
f = plt.figure()
plt.plot(k,ratio, 'black', linewidth = 1.0)



plt.xlabel('Number of orbits, n')
plt.ylabel('Ratio, b/a')
plt.title('Ratio of semimajor and semiminor versus number of orbits')

plt.show()
f.savefig("Ratio.pdf", format = 'pdf', bbox_inches = "tight")
```



In [5]:
```
# Call Velocity.dat file to plot velocity as a function of orbits
filename = 'Velocity.dat'

all_datav = np.loadtxt(filename, skiprows=0)
all_datav = all_datav.transpose()

k = all_datav[0]
velocity= all_datav[1]
```

In [6]:
```
# Plot velocity as a function of orbits at r_max
f = plt.figure()
plt.plot(k,velocity, 'black', linewidth = 1.0)



plt.xlabel('Number of orbits, n')
plt.ylabel('Velocity at $r_{max}$, m/s')
plt.title('Velocity as a function of orbits')

plt.show()
f.savefig("Velocity.pdf", format = 'pdf', bbox_inches = "tight")
```



As each successive orbit the speed at r_{max} is steadily increasing with each orbit. This is because for an ellpitical orbit angular momentum has to be conserved, thus as the orbit shrinks to a smaller circular orbit the speed at r_{max} has to increase as the reduction of velocity as r_{min} decreases by a fraction of 0.1.