

In [8]:

```
import numpy as np
import math

def pol2rec(r, theta):
    rad = math.radians(theta)
    x = r*math.cos(rad)
    y = r*math.sin(rad)

    #x = r cos theta
    #y = r sin theta

    return x, y

def rec2pol(x, y):
    r = math.sqrt(x**2 + y**2)
    theta = math.degrees(math.atan2(y, x))

    #r=√x²+y²
    #θ=tan⁻¹(y/x)
    return r, theta

x,y = pol2rec(4,35)
print(f'{x:.3f}')
print(f'{y:.3f}')
```

3.277
2.294

In [9]:

```
import numpy as np
import math
import matplotlib.pyplot as plt

def saetistolur_edalloftt(k):
    sk = ((k+1)*(k+2)*(k+3))/6
    if k % 2 == 1:
        return sk -2
    else:
        return sk + k //2 - 1
```

In [10]:

```
def lota(s):
    k = 0
    while k <= 7:
        k +=1
        if saetistolur_edalloftt(k-1) < s and s <= saetistolur_edalloftt(k):
            return k

    #Leiðbeining: Lotuna má finna með while-lykkju og fallinu úr lið 1
def flokkur(s):
    k = lota(s)
    sk = saetistolur_edalloftt(k)
    sk_prev = saetistolur_edalloftt(k - 1) if k > 1 else 0

    if s == 1:
        return 1
    elif 1 < s and s <= sk_prev + 2:
        return s - sk_prev
    else:
        return max(3, 18 + s - sk)
```

In [11]:

```
def íslenska(s):
```

```

"""notað sem 'key' í sort eða sorted til að raða í íslenska stafrófsröð,
t.d. print(sorted(['ár', 'bára', 'bali', 'akur'], key=íslenska))"""
return [íslenska.k.get(c.lower(),0) for c in s]
íslenska.a = list('0123456789aábcdðeéfgghiíjklmnoópqrstuúvwxyzþæö')
íslenska.k = dict(zip(íslenska.a, range(1,len(íslenska.a)+1)))

skrjá = "https://cs.hi.is/python/allir-malmar.txt"
A = np.loadtxt(skrjá, skiprows=1, delimiter=';', dtype='str', encoding='UTF-8').T
efnatákn = A[0].tolist()
nafn = A[1].tolist()
sætistala = A[2].astype(int)
A3 = np.char.replace(A[3], ",", ".")
eðlisþyngd = A3.astype(float)
bræðslumark = A[4].astype(int)
enskt_nafn = A[5].tolist()

tafla = dict(zip(nafn, enskt_nafn))
rodud_nofn = sorted(nafn, key=íslenska)
for íslenskt_nafn in rodud_nofn:
    enska_nafnid = tafla[íslenskt_nafn]
    print(f"{íslenskt_nafn} - {enska_nafnid}")

```

aktín - Actinium
 ál - Aluminum
 barín - Barium
 beryllín - Beryllium
 bismút - Bismuth
 blý - Lead
 dysprósín - Dysprosium
 erbín - Erbium
 evrópín - Europium
 fransín - Francium
 gadólín - Gadolinium
 gallín - Gallium
 gull - Gold
 hafnín - Hafnium
 hól mín - Holmium
 indín - Indium
 iridín - Iridium
 járn - Iron
 kadmín - Cadmium
 kalín - Potassium
 kalsín - Calcium
 kopar - Copper
 kóbalt - Cobalt
 króm - Chromium
 kvikasilfur - Mercury
 lantan - Lanthanum
 litín - Lithium
 lútetín - Lutetium
 magnesín - Magnesium
 mangan - Manganese
 mólýbden - Molybdenum
 natrín - Sodium
 neódým - Neodymium
 neptún - Neptunium
 nikkell - Nickel
 níóbín - Niobium
 osmín - Osmium
 palladín - Palladium
 platína - Platinum
 plúton - Plutonium
 pólon - Polonium
 praseódým - Praseodymium
 prometín - Promethium
 prótaktín - Protactinium
 radín - Radium
 renín - Rhenium
 ródín - Rhodium
 rúbídín - Rubidium
 rúþen - Ruthenium

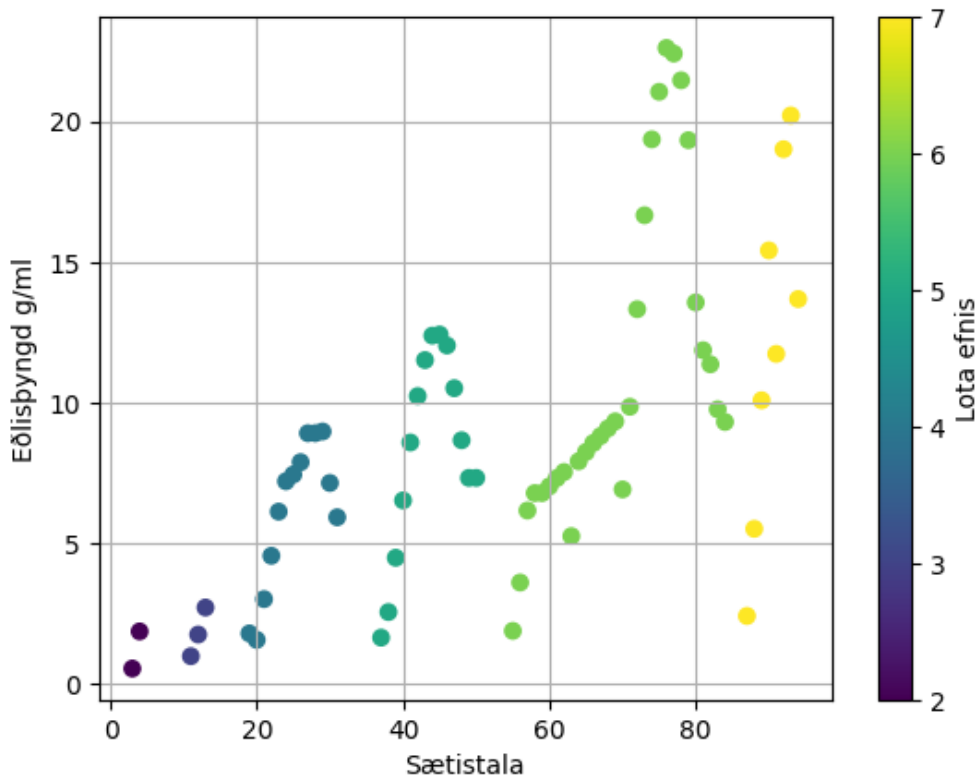
samarín - Samarium
serín - Cerium
sesín - Cesium
silfur - Silver
sink - Zinc
sirkon - Zirconium
skandín - Scandium
strontín - Strontium
tantal - Tantalum
teknetín - Technetium
terbín - Terbium
tin - Tin
títan - Titanium
túlín - Thulium
úran - Uranium
vanadín - Vanadium
volfram - Tungsten
ytterbín - Ytterbium
yttrín - Yttrium
þallín - Thallium
þórín - Thorium

In [14]:

```
import matplotlib.pyplot as plt

lota_efnis = []
for x in sætistala:
    lota_efnis.append(lota(x))

plt.scatter(sætistala, eðlisþyngd, c=lota_efnis)
plt.colorbar(label='Lota efnis')
plt.xlabel('Sætistala')
plt.ylabel('Eðlisþyngd g/ml')
plt.grid()
```



In [13]:

```
scatter2 = plt.scatter(sætistala, bræðslumark, c=lota_efnis)
plt.colorbar(scatter2)
plt.xlabel('Sætistala')
plt.ylabel('Bræðslumark')
plt.grid()
```

```
plt.show()
```

