Hér er dæmi 8. Pólhnit:

In [ ]:

```
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(yx)
    return r, theta
```

Hér er liður 23. Málmavinnsla:

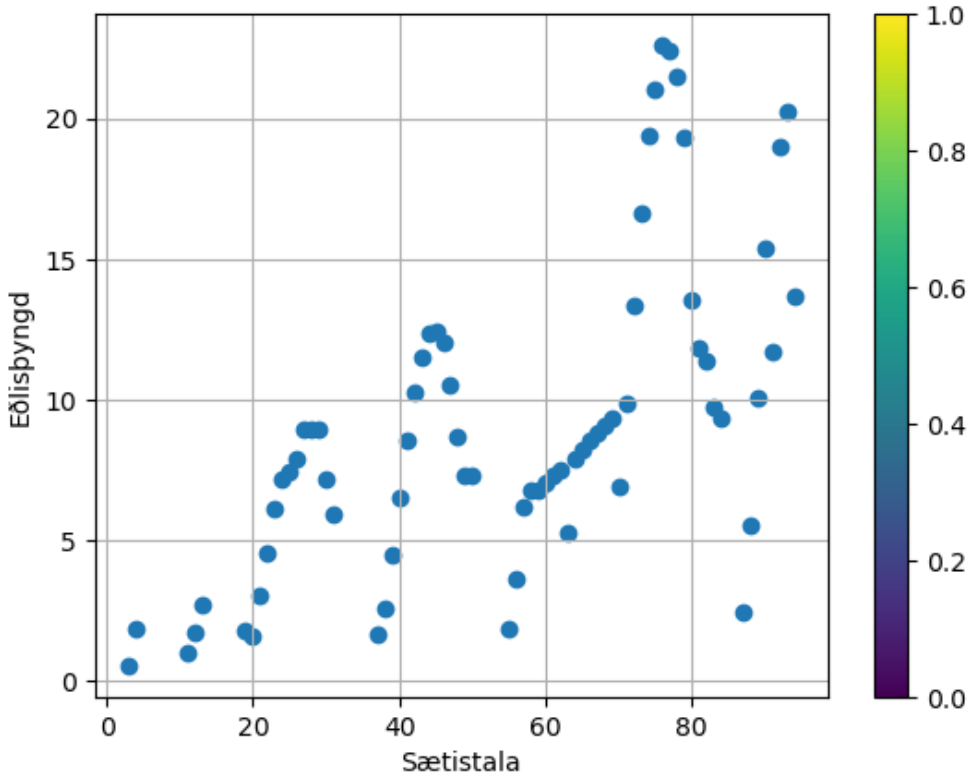
In [5]:

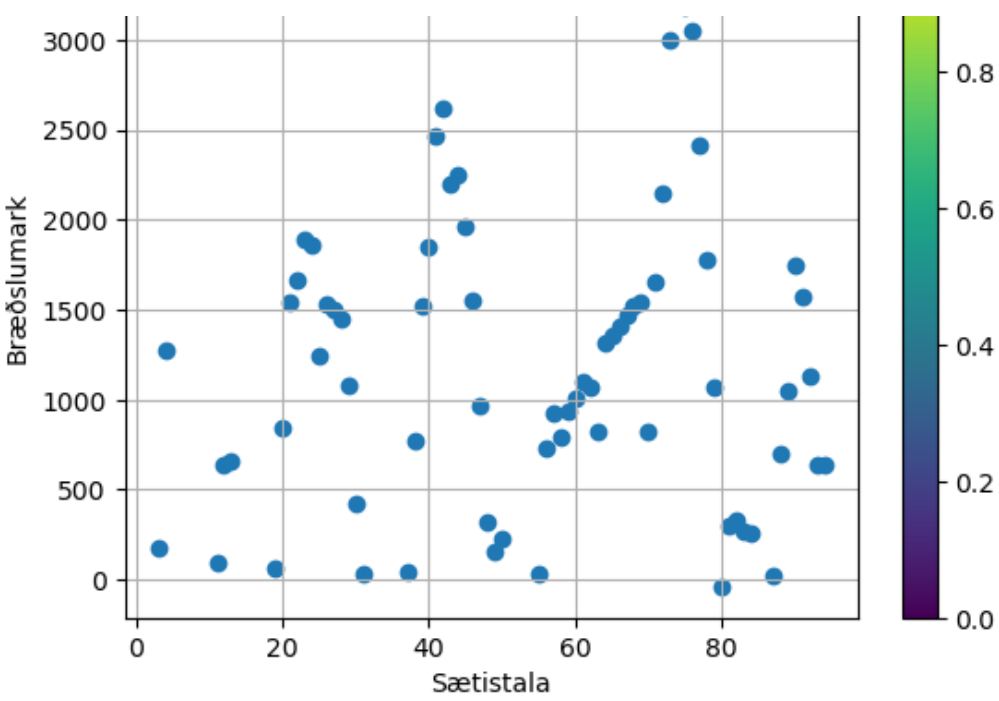
```
import numpy as np
import math
import matplotlib.pyplot as plt

def saetistolur_edalloftt(k):
    if k % 2 == 0:
        sk = ((k+1)*(k+2)*(k+3))//6 + (k//2 - 1)
    else:
        sk = ((k+1)*(k+2)*(k+3))//6 - 2

    return sk

def lota(s):
    while True:
        k = 1
        if k > 1:
            sk_prev = saetistolur_edalloftt(k - 1)
        else:
            sk_prev = 0

        sk = saetistolur_edalloftt(k)

        if sk_prev < s <= sk:
            return k
        k += 1

    #Leiðbeining: Lotuna má finna með while-lykkju og fallinu úr lið 1
    return lotunr
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 <= sk_prev + 2:
        return s - sk_prev
    else:
        return max(3, 18 + s - sk)

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('0123456789aábcdðeéfghiíjklmnoópqrstuúvwxyýzþæö')
íslenska.k = dict(zip(íslenska.a, range(1,len(íslenska.a)+1)))


skrá = "https://cs.hi.is/python/allir-malmar.txt"
A = np.loadtxt(skrá, skiprows=1, delimiter=';', dtype='str').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 islenskt_nafn in rodud_nofn:
    enska_nafnid = tafla[islenskt_nafn]
    print(f"{islenskt_nafn} - {enska_nafnid}")

scatter = plt.scatter(sætistala, eðlisþyngd)
plt.colorbar(scatter)
plt.xlabel('Sætistala')
plt.ylabel('Eðlisþyngd')
plt.grid()
plt.show()

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

```
Ã¾Ã³rÃn - Thorium
Ã¾allÃn - Thallium
Ã¡l - Aluminum
Ã°ran - Uranium
aktÃn - Actinium
barÃn - Barium
berylÃn - Beryllium
bismÃ°t - Bismuth
blÃ½ - Lead
dysprÃ³sÃn - Dysprosium
erbÃn - Erbium
evrÃ³pÃn - Europium
fransÃn - Francium
gadÃ³lÃn - Gadolinium
gallÃn - Gallium
gull - Gold
hÃ³lmÃn - Holmium
hafnÃn - Hafnium
indÃn - Indium
iridÃn - Iridium
jÃ¡rn - Iron
kÃ³balt - Cobalt
kadmÃn - Cadmium
kalÃn - Potassium
kalsÃn - Calcium
kopar - Copper
krÃ³m - Chromium
kvikasilfur - Mercury
lÃ°tetÃn - Lutetium
```

lantan - Lanthanum
litÃn - Lithium
mÃ³lÃ½bden - Molybdenum
magnesÃn - Magnesium
mangan - Manganese
nÃÃ³bÃn - Niobium
natrÃn - Sodium
neÃ³dÃ½m - Neodymium
neptÃºn - Neptunium
nikkel - Nickel
osmÃn - Osmium
pÃ³lon - Polonium
palladÃn - Palladium
plÃºton - Plutonium
platÃna - Platinum
prÃ³taktÃn - Protactinium
praseÃ³dÃ½m - Praseodymium
prometÃn - Promethium
rÃºÃ¾en - Ruthenium
rÃºbidÃn - Rubidium
rÃ³dÃn - Rhodium
radÃn - Radium
renÃn - Rhenium
samarÃn - Samarium
serÃn - Cerium
sesÃn - Cesium
silfur - Silver
sink - Zinc
sirkon - Zirconium
skandÃn - Scandium
strontÃn - Strontium
tÃºlÃn - Thulium
tÃtan - Titanium
tantal - Tantalum
teknetÃn - Technetium
terbÃn - Terbium
tin - Tin
vanadÃn - Vanadium
volfram - Tungsten
ytterbÃn - Ytterbium
yttrÃn - Yttrium




Bræðslumark
Sætistala
3000
2500
2000
1500
1000
500
0
0
20
40
60
80
0.8
0.6
0.4
0.2
0.0

In [ ]: