

s12

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## 1 36 töluleg diffrun

### 1.1 1.

```
[ ]: from math import sqrt

def f(x): return sqrt(x)

def toldiff(f, a, h):
    y = (f(a+h)-f(a-h))/(2*h)
    return y

print(toldiff(f, 4, 10**-4))
```

0.2500000000205116

### 1.2 2.

```
[ ]: vidmid = 1/(2*sqrt(4))
tafla = [toldiff(f,4,10**(-k)) for k in range(1,11)]
minnsta = 99999 # minnsta skekkja
mIndex = 0      # index af minnstu skekkju
for i in range(len(tafla)):
    temp = abs(vidmid - tafla[i])
    if (temp < minnsta):
        mIndex = i
        minnsta = temp

print(f'nr. output          ms.')
for (i, n) in enumerate(tafla,1):
    print(f'{i:2}. {n:.15} {"*" if i == (mIndex+1) else ""}')

```

nr.	output	ms.
1.	0.250019536592543	
2.	0.250000195313038	
3.	0.250000001953188	
4.	0.250000000020512	
5.	0.250000000001638 *	
6.	0.249999999923922	

7. 0.249999999590855  
8. 0.249999987378402  
9. 0.250000020685093  
10. 0.250000020685093

## 2 39. nálgun við pi

### 2.1 1.

```
[ ]: def taylor(x, n):  
    y = 0  
    for i in range(n):  
        y = y + ((-1)**i) * ((x**(2*i+1)) / (2*i+1))  
  
    return y  
  
print(taylor(0.2, 4))  
print(taylor(0.2, 10))
```

0.19739550476190476  
0.1973955598498807

### 2.2 2.

```
[ ]: def pi():  
    return ((4*taylor(0.2,10)) - taylor(1/239,10))  
  
print(pi()*4)
```

3.1415926535897922

## 3 VV4 A

### 3.1 1.

```
[ ]: def forrit(a,n):  
    if a < 0:  
        return a**n  
    else:  
        return sqrt((a**n)+a)  
  
print(forrit(2,7))  
print(forrit(-2,3))
```

11.40175425099138  
-8

### 3.2 2.

```
[ ]: def finna(arr):  
    for n, i in enumerate(arr):  
        if (i**5+i == 246): return n  
    return -1  
  
arr = [5, 4, 3, 2, 1]  
print(finna(arr))
```

2