```
DD[ k_, a_, n_ ] :=
 Sum[(-1)^(j + 1) Binomial[k, j] DD[ k - j, m, Floor[n / (m^j)]], {m, a, n^(1 / k)}, {j, 1, k}]
DD[ 1, a_, n_ ] := Floor[n] - a + 1
DD[0, a_, n_] := 1
DS[ n_, k_ ] := DD[k, 2, n]
DDD[n_, k_ ] := Sum[ DDD[n / j, k - 1], {j, 2, n}]
DDD[n_, 0] := 1


DS[1000, 2]
```

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```

```
DDD[1000, 2]
```

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```
DS[n, 1]
```

$$-1 + \text{Floor}[n]$$

```
D2[n_] := Sum[ Binomial[2, 1] (Floor[n / m] - m + 1) - Binomial[2, 0], {m, 2, Floor[n^(1 / 2)]}]
```

```
D2[n]
```

```
D3[n_] :=
```

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(-1 + 2 \left(1 - m + \text{Floor}\left[\frac{n}{m}\right]\right)\right)$$

```
Expand[-1 + 2 (1 - m + Floor[n / m])]
```

$$1 - 2\,m + 2\,\text{Floor}\left[\frac{n}{m}\right]$$

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(1 - 2\,m + 2\,\text{Floor}\left[\frac{n}{m}\right]\right)$$

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(1 - 2\,m + 2\,\text{Floor}\left[\frac{n}{m}\right]\right)$$

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 1 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} -2\,m + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 2\,\text{Floor}\left[\frac{n}{m}\right]$$

$$1 - \text{Floor}\left[\sqrt{n}\right]^2 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 2\,\text{Floor}\left[\frac{n}{m}\right]$$

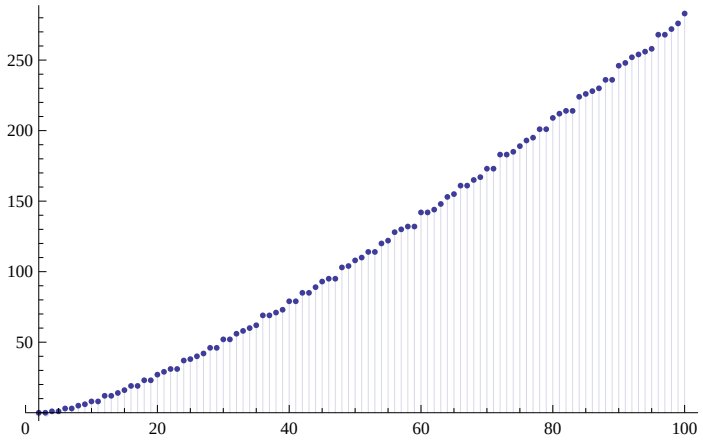
```
D3a[n_] :=
```

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(1 - 2\,m + 2\,\text{Floor}\left[\frac{n}{m}\right]\right)$$

```
D3[n_] :=
```

$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 1 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} -2\,m + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(2\,\text{Floor}\left[\frac{n}{m}\right]\right)$$

```
DiscretePlot[D3[n], {n, 2, 100}]
```




```
D3[1000]
```

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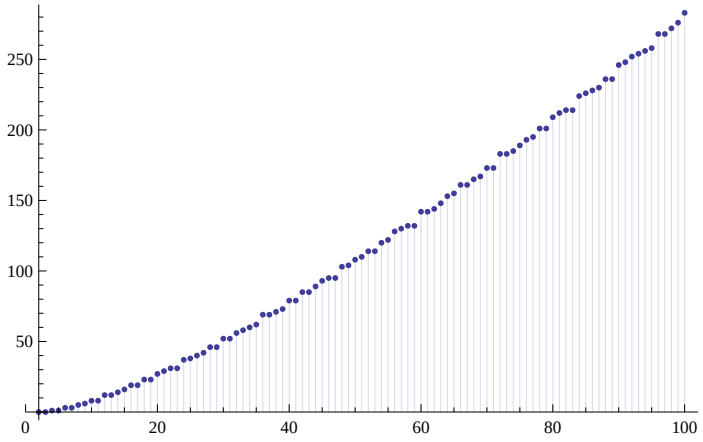
$$\text{FullSimplify}\left[\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 1 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} -2\,m + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(2\,\text{Floor}\left[\frac{n}{m}\right]\right)\right]$$

$$1 - \text{Floor}\left[\sqrt{n}\right]^2 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 2\,\text{Floor}\left[\frac{n}{m}\right]$$

$$\text{D4}[n\_] := 1 - \text{Floor}\left[\sqrt{n}\right]^2 + 2\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \text{Floor}\left[\frac{n}{m}\right]$$

```
DiscretePlot[D4[n], {n, 2, 100}]
```




```
D4[1000]
```

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