```
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


DD[3, 2, 1000]
```

11 217

```
DDD[1000, 3]
```

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

```
-1 + Floor[n]
```

```
D2a[n_] :=
 Sum[ Binomial[3, 2] (Sum[Binomial[2, 1] Binomial[1, 0] Sum[1, {m, j, Floor[(n / (j k))]}] -
       Binomial[2, 0], {j, k, Floor[(n / k)^(1 / 2)]}]) - Binomial[3, 1]
    (Sum[1, {m, k, Floor[n / (k^2)]}]) + Binomial[3, 0], {k, 2, Floor[n^(1 / 3)]}]


D2a[1000]
```

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```
D2a[n]
```

$Aborted

```
DS[1000]
```

```
DS[1000]
```

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

```
D2[n]
```

$$\texttt{D3[n\_] :=} \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} \left(-1 + 2\left(1 - m + \text{Floor}\left[\frac{n}{m}\right]\right)\right)$$

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

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

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

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

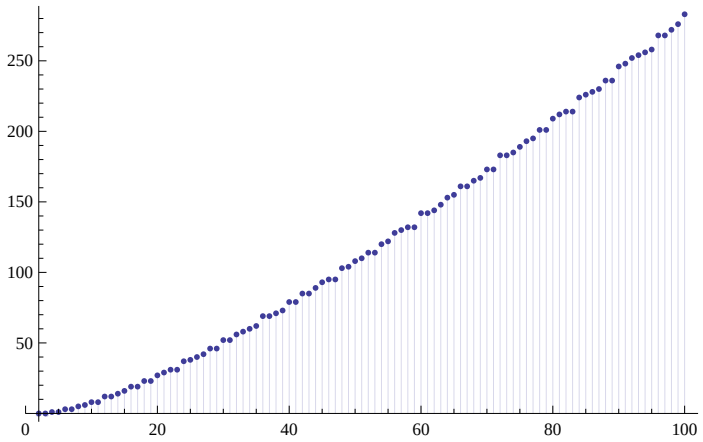
$$\sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 1 + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} -2\,m + \sum_{m=2}^{\text{Floor}\left[\sqrt{n}\right]} 2\,\text{Floor}\left[\frac{n}{m}\right]$$

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

```
D3a[n_] := Sum[(1 - 2 m + 2 Floor[n/m]), {m, 2, Floor[Sqrt[n]]}]
```

```
D3[n_] := Sum[1, {m, 2, Floor[Sqrt[n]]}] + Sum[-2 m, {m, 2, Floor[Sqrt[n]]}] + Sum[(2 Floor[n/m]), {m, 2, Floor[Sqrt[n]]}]
```

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




```
D3[1000]
```

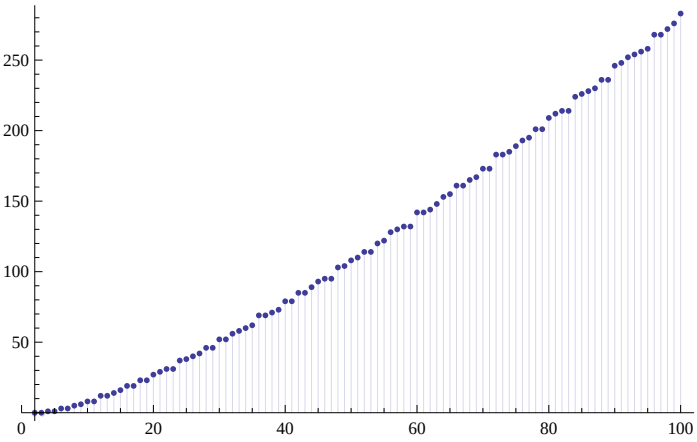
```
5070
```

```
FullSimplify[ Sum[1, {m, 2, Floor[Sqrt[n]]}] + Sum[-2 m, {m, 2, Floor[Sqrt[n]]}] + Sum[(2 Floor[n/m]), {m, 2, Floor[Sqrt[n]]}] ]
```

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

```
D4[n_] := 1 - Floor[Sqrt[n]]^2 + 2 Sum[Floor[n/m], {m, 2, Floor[Sqrt[n]]}]
```

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




```
D4[1000]
```

```
5070
```