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d2e[n_, a_Integer] :=
  (1 - a) ^ 2 - Floor[ n ^ (1 / 2) ] ^ 2 + 2 Sum [ Floor[ n / m] , {m, a, Floor[n ^ (1 / 2) ]}]

dd3e[n_, a_] := (1 - a) ^ 3 + Floor[ n ^ (1 / 3) ] ^ 3 + Sum [ 3 Floor [  $\frac{n}{s^2}$  ] - 3 Floor [  $\sqrt{\text{Floor}[\frac{n}{s}]}$  ] ^ 2 +
  6 Sum [ Floor [ n / m / s ] , {m, s + 1, Floor[Floor[n / s] ^ (1 / 2) ]} ] , {s, a, Floor[n ^ (1 / 3) ]} ]

d2e[n, 1]

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

dd3e[n, 1]
$Aborted

Floor[ n ^ (1 / 3) ] ^ 3 + Sum [ 3 Floor [  $\frac{n}{j^2}$  ] - 3 Floor [  $\sqrt{\text{Floor}[\frac{n}{j}]}$  ] ^ 2 +
  6 Sum [ Floor [ n / k / s ] , {k, j + 1, Floor[Floor[n / j] ^ (1 / 2) ]} ] , {j, 1, Floor[n ^ (1 / 3) ]} ]

$Aborted

Dk3Alt[n_] := Floor[ n ^ (1 / 3) ] ^ 3 + 3 Sum [ Floor [  $\frac{n}{j^2}$  ] - Floor [  $\sqrt{\text{Floor}[\frac{n}{j}]}$  ] ^ 2 +
  2 Sum [ Floor [ n / k / j ] , {k, j + 1, Floor[Floor[n / j] ^ (1 / 2) ]} ] , {j, 1, Floor[n ^ (1 / 3) ]} ]

FF[100]
1471
dd3e[100, 1]
1471

Dk2Alt[n_] := (1 - 1) ^ 2 - Floor[ n ^ (1 / 2) ] ^ 2 + 2 Sum [ Floor[ n / m] , {m, 1, Floor[n ^ (1 / 2) ]}]

Dk2Alt[100]
482
d[n_, z_] := Product[Pochhammer[z, a = p[[2]]] / a!, {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
DD[n_, k_] := Sum[d[j, k], {j, 1, n}]

DD[100, 2]
482
DD[100, 3]
1471

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$$\begin{aligned} \text{Dk3Alt2}[n_] &:= \text{Floor}[n^{1/3}]^3 + 3 \text{Sum}\left[\text{Floor}\left[\frac{n}{j^2}\right] - \text{Floor}\left[\sqrt{\text{Floor}\left[\frac{n}{j}\right]}\right]^2 + \right. \\ &\quad \left. 2 \text{Sum}[\text{Floor}[n/k/j], \{k, j+1, \text{Floor}[\text{Floor}[n/j]^{(1/2)}]\}], \{j, 1, \text{Floor}[n^{(1/3)}]\}\right] \end{aligned}$$