```
(*NOTE!!!!! : Ignore DivisorSigma[k,n].  It is a stupid function.*)
d[ n_, z_] := Product[Pochhammer[z, a = p[[2]]] / a!, {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
da[n_, k_, s_] := Sum[da[j, k - 1, s] da[n / j, 1, s], {j, Divisors[n]}];
da[n_, 1, s_] := n^s;
da[n_, 0, s_] := 0;
da[1, 0, s_] := 1

d2a[n_, k_, s_] := Sum[d2a[j, k - 1, s] d2a[n / j, 1, s], {j, Divisors[n]}];
d2a[n_, 1, s_] := n^s;
d2a[1, 1, s_] := 0;
d2a[n_, 0, s_] := 0;
d2a[1, 0, s_] := 1

p2a[n_, t_] := Sum[ (-1)^(k - 1) / k d2a[n, k, t], {k, 1, Log[2, n]}]

DDA[n_, k_, t_] := Sum[DDA[Floor[n / j], k - 1, t], {j, 1, n}]
DDA[n_, 0, t_] := n^t
DA[n_, k_, t_] := DDA[n, 0, t] - DDA[n - 1, 0, t]
D2A[n_, k_, t_] := Sum[d2a[j, 1, t] D2A[Floor[n / j], k - 1, t], {j, 2, n}]
D2A[n_, 0, t_] := n^t
d2A[n_, k_, t_] := D2A[n, k, t] - D2A[n - 1, k, t]
P2a[n_, t_] := Sum[ (-1)^(k - 1) / k D2A[n, k, t], {k, 1, Log[2, n]}]

P2a[9, 1] - P2a[8, 1]
p2a[9, 1]
```

$$\frac{15}{2}$$

$$\frac{9}{2}$$

```
StrictDivisors[A_, k_, n_] :=
 Sum[strictDivisors[A, 1, j] StrictDivisors[A, k - 1, n / j], {j, 2, n}]
strictDivisors[A_, 1, n_] := n^A
StrictDivisors[A_, 0, n_] := 1
StrictP[n_, t_] := Sum[ (-1)^(k - 1) / k StrictDivisors[t, k, n], {k, 1, Log[2, n]}]

StrictP[9, 1] - StrictP[8, 1]
```

$$\frac{9}{2}$$

```
Table[{k, da[8, k, 3], 8^3 (k) (k + 1) (k + 2) / 6}, {k, 1, 9}] // TableForm
```

1	512	512
2	2048	2048
3	5120	5120
4	10 240	10 240
5	17 920	17 920
6	28 672	28 672
7	43 008	43 008
8	61 440	61 440
9	84 480	84 480

```
Table[{k, da[27, k, 2], 27^2 k (k + 1) (k + 2) / 6}, {k, 1, 9}] // TableForm
```

1	729	729
2	2916	2916
3	7290	7290
4	14 580	14 580
5	25 515	25 515
6	40 824	40 824
7	61 236	61 236
8	87 480	87 480
9	120 285	120 285

```
da[60, k = 2, s = 1]
da[2^2, k, s] da[3, k, s] da[5, k, s]
```

720

720

```
da[224, 3, 3]
```

708 083 712

```
da[224, 3, 0] 224^3
```

708 083 712

```
d2a[4 × 9, 2, 1]
```

252

```
d2a[4, 2, 1] d2a[9, 2, 1]
d2a[4 × 9, 2, 0] 36
```

252

```
d2a[225, 3, 3]
```

136 687 500

```
d2a[225, 3, 0] 225^3
```

136 687 500