

```

StrictDivisors[A_, k_, n_] := Sum[j^A StrictDivisors[A, k - 1, n / j], {j, 2, n}]
StrictDivisors[A_, 1, n_] := Sum[j^A, {j, 2, n}]
SumPrimes[A_, n_] := Sum[(-1)^(k + 1) / (j k) MoebiusMu[j] StrictDivisors[j A, k, n^(1 / j)],
  {j, 1, Log[2, n]}, {k, 1, Log[2, (n^(1 / j))]}]

Smallld[A_, k_, n_] := StrictDivisors[A, k, n] - StrictDivisors[A, k, n - 1]
SumPowerRange[0, start_, end_] := Floor[end] - (start - 1)
SumPowerRange[1, start_, end_] := Floor[end] (Floor[end] + 1) / 2 - (start - 1) start / 2
SumPowerRange[2, start_, end_] :=
  Floor[end] (Floor[end] + 1) (2 Floor[end] + 1) / 6 - (start - 1) start (2 start - 1) / 6
SumPowerRange[A_, start_, end_] := Sum[m^A, {m, start, end}]
StrictDivisorsFast[A_, 1, n_] := SumPowerRange[A, 2, n]

StrictDivisorsFast[A_, k_, n_] :=
  Sum[j^A StrictDivisors[A, k - 1, n / j], {j, Floor[n^(1 / 3)] + 1, n^(1 / 2)}] +
  Sum[SumPowerRange[A, Floor[n / (j + 1)] + 1, n / j] StrictDivisors[A, k - 1, j],
    {j, 1, n / Floor[n^(1 / 2)] - 1}] +
  Sum[Smallld[A, k - 1, j] SumPowerRange[A, 2, n / j], {j, 2, n^(1 / 3)}] +
  Sum[s^A Smallld[A, m, j] StrictDivisors[A, k - m - 1, n / (j s)], {j, 2, n^(1 / 3)},
    {s, Floor[Floor[n^(1 / 3)] / j] + 1, Floor[n / j]^(1 / 2)}, {m, 1, k - 2}] +
  Sum[(SumPowerRange[A, Floor[n / (j (s + 1))] + 1, n / (j s)])
    (Sum[Smallld[A, m, j] StrictDivisors[A, k - m - 1, s], {m, 1, k - 2}]),
    {j, 2, n^(1 / 3)}, {s, 1, Floor[n / j] / Floor[Floor[n / j]^(1 / 2)] - 1}]
SumPrimesFast[A_, n_] := Sum[(-1)^(k + 1) / (j k) MoebiusMu[j]
  StrictDivisorsFast[j A, k, n^(1 / j)], {j, 1, Log[2, n]}, {k, 1, Log[2, (n^(1 / j))]}]
SumPrimesFast[0, 1000]

```