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StrictDivisorsHyperbola[A_, k_, n_, s_] :=
  Sum[(m^A)^(k-j)) Binomial[k, j] StrictDivisorsHyperbola[A, j, n/(m^(k-j)), m+1],
  {m, s, n^(1/k)}, {j, 0, k-1}]
StrictDivisorsHyperbola[A_, 0, n_, s_] := 1
SumPrimesHyperbola[A_, n_] :=
  Sum[(-1)^(k+1)/(j k) MoebiusMu[j] StrictDivisorsHyperbola[j A, k, n^(1/j), 2],
  {j, 1, Log[2, n]}, {k, 1, Log[2, (n^(1/j))]}]
Smallld[A_, k_, n_] := StrictDivisorsHyperbola[A, k, n, 2] -
  StrictDivisorsHyperbola[A, k, n-1, 2]
StrictDivisorsReduced[a_, A_, k_, n_] :=
  Sum[Smallld[A, 1, j] StrictDivisors[A, k-1, n/j], {j, a+1, n}] +
  Sum[Smallld[A, k-1, j] StrictDivisors[A, 1, n/j], {j, 2, a}] +
  Sum[Smallld[A, 1, s] Smallld[A, m, j] StrictDivisors[A, k-m-1, n/(j s)],
  {j, 2, a}, {s, Floor[a/j]+1, n/j}, {m, 1, k-2}]
StrictDivisorsReduced[a_, A_, 1, n_] := Sum[j^A, {j, 2, n}]
SumPrimesReduced[A_, n_] := Sum[
  (-1)^(k+1)/(j k) MoebiusMu[j] StrictDivisorsReduced[Floor[n^(1/3)], j A, k, n^(1/j)],
  {j, 1, Log[2, n]}, {k, 1, Log[2, (n^(1/j))]}]
StrictDivisorsFullReduced[A_, k_, n_] :=
  Sum[j^A StrictDivisorsHyperbola[A, k-1, n/j, 2], {j, Floor[n^(1/3)]+1, n^(1/2)}] +
  Sum[Sum[m^A, {m, Floor[n/(j+1)]+1, n/j}] StrictDivisorsHyperbola[A, k-1, j, 2],
  {j, 1, n/Floor[n^(1/2)]-1}] +
  Sum[Smallld[A, k-1, j] Sum[m^A, {m, 2, n/j}], {j, 2, n^(1/3)}] +
  Sum[s^A Smallld[A, m, j] StrictDivisorsHyperbola[A, k-m-1, n/(j s), 2],
  {j, 2, n^(1/3)}, {s, Floor[Floor[n^(1/3)]/j]+1, Floor[n/j]^(1/2)}, {m, 1, k-2}] +
  Sum[(Sum[m^A, {m, Floor[n/(j(s+1))]+1, n/(j s)}])
  (Sum[Smallld[A, m, j] StrictDivisorsHyperbola[A, k-m-1, s, 2], {m, 1, k-2}]),
  {j, 2, n^(1/3)}, {s, 1, Floor[n/j]/Floor[Floor[n/j]^(1/2)]-1}]
StrictDivisorsFullReduced[A_, 1, n_] := Sum[j^A, {j, 2, n}]
SumPrimesFullReduced[A_, n_] :=
  Sum[(-1)^(k+1)/(j k) MoebiusMu[j] StrictDivisorsFullReduced[j A, k, n^(1/j)],
  {j, 1, Log[2, n]}, {k, 1, Log[2, (n^(1/j))]}]

SumPrimesFullReduced[1, 100]

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