

```

pri[n_] := Sum[PrimePi[n^(1/k)]/k, {k, 1, Log2@n}]
FI[n_] := FI[n] = FactorInteger[n]; FI[1] := {}
dz[n_, z_] := dz[n, z] = Product[Pochhammer[z, p[[2]]]/p[[2]]!, {p, FI[n]}]

Clear[Mul1]
Ad2[{}, m_] := 1
Ad2[n_, m_] := Sum[Ad2[Rest[n], m - j/First[n]], {j, 1, First[n]*m}]
Ad1[{}, m_] := 1
Ad1[n_, m_] := Sum[Ad1[Rest[n], m - j/First[n]], {j, 0, First[n]*m}]
Mul2[{}, m_] := 1
Mul2[n_, m_] := Mul2[n, m] = Sum[Mul2[Rest[n], m - Log[First[n], j]], {j, 2, First[n]^m}]
Mul1[{}, m_] := 1
Mul1[n_, m_] := Mul1[n, m] = Sum[Mul1[Rest[n], m - Log[First[n], j]], {j, 1, First[n]^m}]
Mul2[{50, 100}, 1] - Mul2[{50, 50, 100, 100}, 1]/2 +
  Mul2[{50, 50, 50, 100, 100, 100}, 1]/3 - Mul2[{50, 50, 50, 50, 100, 100, 100, 100}, 1]/4
ps[n_, m_, k_] := Flatten[{Table[n, {i, 1, k}], Table[m, {i, 1, k}]}]
MulM1[n_, m_, k_] := Sum[(-1)^(k-j) Binomial[k, j] Mul1[ps[n, m, j], 1], {j, 0, k}]
Table[Mul1[ps[100, 100, k], 1], {k, 1, 3}]
{482, 3575, 14393}
Table[MulM1[100, 100, k], {k, 1, 7}]
{481, 2612, 5113, 4744, 2192, 448, 0}
Sum[(-1)^(k+1)/k MulM1[100, 100, k], {k, 1, 7}]
856
15
pri[100] + pri[100]
856
15
Sum[(-1)^(k+1)/k MulM1[50, 100, k], {k, 1, 7}]
933
20
pri[50] + pri[100]
933
20
Sum[(-1)^(k+1)/k Mul2[ps[50, 100, k], 1], {k, 1, 7}]
406
3
MulM1[20, 30, 2]
General::stop: Further output of Sum::itflw will be suppressed during this calculation. >>
220
Mul2[{20, 20, 30, 30}, 1] + 2 Mul2[{20, 20, 30}, 1] +
  2 Mul2[{20, 30, 30}, 1] + Mul2[{20, 20}, 1] + Mul2[{30, 30}, 1] + 2 Mul2[{20, 30}, 1]
220

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