

$$\text{Limit}[\text{Sum}[(a - 1) a^k, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{-1 + n\}$$

$$\text{Limit}[\text{Sum}[(a - 1) (-1)^k a^k, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Limit} \left[\frac{(-1 + a) a \left(-1 + (-1)^{\frac{\text{Log}[n]}{\text{Log}[a]}} n \right)}{1 + a}, a \rightarrow 1 \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) (-1)^{(k + 1) / k} a^k, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Limit} \left[-(-1 + a) \left((-1)^{\frac{\text{Log}[n]}{\text{Log}[a]}} a n \text{LerchPhi} \left[-a, 1, 1 + \frac{\text{Log}[n]}{\text{Log}[a]} \right] - \text{Log}[1 + a] \right), a \rightarrow 1 \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) a^{(2k - 1)}, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{1}{2} (-1 + n^2) \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) a^{(2k)}, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{1}{2} (-1 + n^2) \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) a^{(k / 2)}, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ 2 (-1 + \sqrt{n}) \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) a^{(\text{Sin}[k])}, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Limit} \left[\sum_{k=1}^{\frac{\text{Log}[n]}{\text{Log}[a]}} (-1 + a) a^{\text{Sin}[k]}, a \rightarrow 1 \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[a], \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{\text{Log}[n] \text{Sin}[1]\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[a]^k, \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Limit} \left[\frac{(-1 + a) \text{Sin}[a] \left(-1 + \text{Sin}[a]^{\frac{\text{Log}[n]}{\text{Log}[a]}} \right)}{-1 + \text{Sin}[a]}, a \rightarrow 1 \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[k a], \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Limit} \left[\frac{1}{2} \left(\text{Csc} \left[\frac{a}{2} \right] \text{Sin} \left[\frac{a - \pi}{2} \right] - a \text{Csc} \left[\frac{a}{2} \right] \text{Sin} \left[\frac{a - \pi}{2} \right] - \text{Csc} \left[\frac{a}{2} \right] \text{Sin} \left[\frac{a \text{Log}[a] - \pi \text{Log}[a] + 2 a \text{Log}[n]}{2 \text{Log}[a]} \right] + a \text{Csc} \left[\frac{a}{2} \right] \text{Sin} \left[\frac{a \text{Log}[a] - \pi \text{Log}[a] + 2 a \text{Log}[n]}{2 \text{Log}[a]} \right] \right), a \rightarrow 1 \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[\text{Pi} a], \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{0\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[a / \text{Pi}], \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Log}[n] \text{Sin} \left[\frac{1}{\pi} \right] \right\}$$

$$\text{Limit}[\text{Sum}[(a - 1) \text{Sin}[2 a / \text{Pi}], \{k, 1, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \text{Log}[n] \text{Sin} \left[\frac{2}{\pi} \right] \right\}$$

Limit[Sum[(a - 1) Sin[k], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \text{Limit}\left[\frac{1}{2} \left(\text{Csc}\left[\frac{1}{2}\right] \sin\left[\frac{1-\pi}{2}\right] - a \text{Csc}\left[\frac{1}{2}\right] \sin\left[\frac{1-\pi}{2}\right] - \text{Csc}\left[\frac{1}{2}\right] \sin\left[\frac{\text{Log}[a] - \pi \text{Log}[a] + 2 \text{Log}[n]}{2 \text{Log}[a]}\right] \right) + a \text{Csc}\left[\frac{1}{2}\right] \sin\left[\frac{\text{Log}[a] - \pi \text{Log}[a] + 2 \text{Log}[n]}{2 \text{Log}[a]}\right] \right], a \rightarrow 1 \right\}$$

Limit[Sum[(a - 1) Sin[2 a], {k, 1, Log[a, n]}], {a → 1}]

$$\{\text{Log}[n] \sin[2]\}$$

Limit[Sum[(a - 1) Sin[Pi k], {k, 1, Log[a, n]}], {a → 1}]

$$\{0\}$$

Limit[Sum[(a - 1) Sin[Pi k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{2 \text{Log}[n]}{\pi} \right\}$$

Limit[Sum[(a - 1) ^ 2 k Sin[Pi k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n]^2}{\pi} \right\}$$

Limit[Sum[(a - 1) Sin[n k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ -\frac{(-1 + \cos[n]) \text{Log}[n]}{n} \right\}$$

Limit[Sum[(a - 1) Sin[n k / (2 Log[a, n])], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{4 \text{Log}[n] \sin\left[\frac{n}{4}\right]^2}{n} \right\}$$

Limit[Sum[(a - 1) Sin[2 n k / (Log[a, n])], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \sin[n]^2}{n} \right\}$$

Limit[Sum[(a - 1) Sin[2 n k / (Log[a, n])], {k, 0, Infinity}], {a → 1}]

$$\left\{ \frac{\text{Log}[n]}{2 n} \right\}$$

Limit[Sum[(a - 1) Sin[n k / (Log[a, n])], {k, 0, Infinity}], {a → 1}]

$$\left\{ \frac{\text{Log}[n]}{n} \right\}$$

Limit[Sum[(a - 1) Cos[n k / Log[a, n]], {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \sin[n]}{n} \right\}$$

Limit[Sum[(a - 1) a ^ k Cos[n k / Log[a, n]], {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{e^{-i n} \text{Log}[n] \left(-i \left(-1 + e^{2 i n} \right) n^2 + \left(-2 e^{i n} + n + e^{2 i n} n \right) \text{Log}[n] \right)}{2 \left(n^2 + \text{Log}[n]^2 \right)} \right\}$$

Limit[Sum[(a - 1) Cos[n k / Log[a, n]] ^ 2, {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] (n + \cos[n] \sin[n])}{2 n} \right\}$$

Limit[Sum[(a - 1) Sin[n k / Log[a, n]] ^ 2, {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] (n - \text{Cos}[n] \text{Sin}[n])}{2 n} \right\}$$

Limit[Sum[(a - 1) Sin[n k / Log[a, n]] ^ 3, {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{4 (2 + \text{Cos}[n]) \text{Log}[n] \text{Sin}\left[\frac{n}{2}\right]^4}{3 n} \right\}$$

Limit[Sum[(a - 1) Cos[2 n k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Cos}[n] \text{Log}[n] \text{Sin}[n]}{n} \right\}$$

Limit[Sum[(a - 1) Cos[(1 / 2) n k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{2 \text{Log}[n] \text{Sin}\left[\frac{n}{2}\right]}{n} \right\}$$

Limit[Sum[(a - 1) Sin[2 n k / Log[a, n]], {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \text{Sin}[n]^2}{n} \right\}$$

Limit[Sum[(a - 1) Sin[(1 / 2) n k / Log[a, n]], {k, 1, Log[a, n]}], {a → 1}]

$$\left\{ \frac{4 \text{Log}[n] \text{Sin}\left[\frac{n}{4}\right]^2}{n} \right\}$$

Limit[Sum[(a - 1) (Cos[n k / Log[a, n]] - 1), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] (-n + \text{Sin}[n])}{n} \right\}$$

Limit[Sum[(a - 1) ^ 2 (k Cos[n k / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n]^2 (-1 + \text{Cos}[n] + n \text{Sin}[n])}{n^2} \right\}$$

Limit[Sum[(a - 1) (Cos[Pi n k / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \text{Sin}[n \pi]}{n \pi} \right\}$$

Limit[Sum[(a - 1) (Cos[2 Pi n k / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \text{Sin}[2 n \pi]}{2 n \pi} \right\}$$

Limit[Sum[(a - 1) (Cos[n k / Log[a, n] / Pi]), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\pi \text{Log}[n] \text{Sin}\left[\frac{n}{\pi}\right]}{n} \right\}$$

Limit[Sum[(a - 1) (Cos[n k / Log[a, n]]) (Sin[n k / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]

$$\left\{ \frac{\text{Log}[n] \text{Sin}[n]^2}{2 n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) ((\text{Cos}[nk / \text{Log}[a, n]]) + (\text{Sin}[nk / \text{Log}[a, n]])), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ -\frac{\text{Log}[n] (-1 + \text{Cos}[n] - \text{Sin}[n])}{n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) ((\text{Cos}[nk / \text{Log}[a, n]]) - (\text{Sin}[nk / \text{Log}[a, n]])), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{\text{Log}[n] (-1 + \text{Cos}[n] + \text{Sin}[n])}{n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Cos}[kn / \text{Log}[a, 2n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{\text{Log}[2n] \text{Sin}\left[\frac{n \text{Log}[n]}{\text{Log}[2n]}\right]}{n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Cos}[kE^n / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{e^{-n} \text{Log}[n] \text{Sin}[e^n]\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Cos}[k1/n / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ n \text{Log}[n] \text{Sin}\left[\frac{1}{n}\right] \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Sin}[k1/n / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ -n \left(-1 + \text{Cos}\left[\frac{1}{n}\right] \right) \text{Log}[n] \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Sin}[kE^n / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{-e^{-n} (-1 + \text{Cos}[e^n]) \text{Log}[n]\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Sin}[kE^{-n} / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{-e^n (-1 + \text{Cos}[e^{-n}]) \text{Log}[n]\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Cos}[kE^{-n} / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{e^n \text{Log}[n] \text{Sin}[e^{-n}]\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Cosh}[kn / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{\text{Log}[n] \text{Sinh}[n]}{n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) (\text{Sinh}[kn / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\left\{ \frac{2 \text{Log}[n] \text{Sinh}\left[\frac{n}{2}\right]^2}{n} \right\}$$

$$\text{Limit}[\text{Sum}[(a-1) a^k, \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{-1 + n\}$$

$$\text{Limit}[n / \text{Log}[n] (a-1) \text{Sum}[(\text{Cos}[kn / \text{Log}[a, n]]), \{k, 0, \text{Log}[a, n]\}], \{a \rightarrow 1\}]$$

$$\{\text{Sin}[n]\}$$

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Limit[n / Log[n] (a - 1) Sum[(Sin[k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{1 - Cos[n]}

Limit[Pi n / Log[n] (a - 1) Sum[(Cos[Pi k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{Sin[n π]}

Limit[n / Log[n] (a - 1) Sum[(1 - Cos[k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{n - Sin[n]}

Limit[n / Log[n] (a - 1) Sum[(Sin[2 k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{Sin[n]^2}

Limit[n / Log[n] (a - 1) Sum[(Cos[2 k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{Cos[n] Sin[n]}

Limit[n / Log[n] (a - 1) Sum[(Cos[(1/2) k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{2 Sin[n/2]}

Limit[n^2 / Log[n] (a - 1) Sum[(Cos[k n^2 / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{Sin[n^2]}

Limit[n^2 / Log[n] (a - 1) Sum[(Sin[k n^2 / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{1 - Cos[n^2]}

Limit[
  n / Log[n] (a - 1) Sum[Cos[k n / Log[a, n]] - Sin[k n / Log[a, n]], {k, 0, Log[a, n]}], {a → 1}]
{-1 + Cos[n] + Sin[n]}

Limit[
  n / Log[n] (a - 1) Sum[Cos[k n / Log[a, n]] Sin[k n / Log[a, n]], {k, 0, Log[a, n]}], {a → 1}]
{Sin[n]^2 / 2}

Limit[n / Log[n] (a - 1) Sum[Cos[k n / Log[a, n]]^2, {k, 0, Log[a, n]}], {a → 1}]
{1/2 (n + Cos[n] Sin[n])}

Limit[n / Log[n] (a - 1) Sum[(1 - Cos[k n / Log[a, n]])^2, {k, 0, Log[a, n]}], {a → 1}]
{1/4 (6 n - 8 Sin[n] + Sin[2 n])}

Limit[n / Log[n] (a - 1) Sum[(1 - Sin[k n / Log[a, n]])^2, {k, 0, Log[a, n]}], {a → 1}]
{1/2 (-4 + 3 n + 4 Cos[n] - Cos[n] Sin[n])}

Limit[n / Log[n] (a - 1) Sum[(Sin[k n / Log[a, n]])^2, {k, 0, Log[a, n]}], {a → 1}]
{1/2 (n - Cos[n] Sin[n])}

Limit[n / Log[n] (a - 1) Sum[(Cos[-Pi/2 + k n / Log[a, n]]), {k, 0, Log[a, n]}], {a → 1}]
{1 - Cos[n]}

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Limit[ n^2 / Log[n]^2 (a - 1)^2 Sum[k (Cos[k n / Log[a, n]]), {k, 0, Log[a, n]}], {a -> 1}]
{-1 + Cos[n] + n Sin[n]}
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