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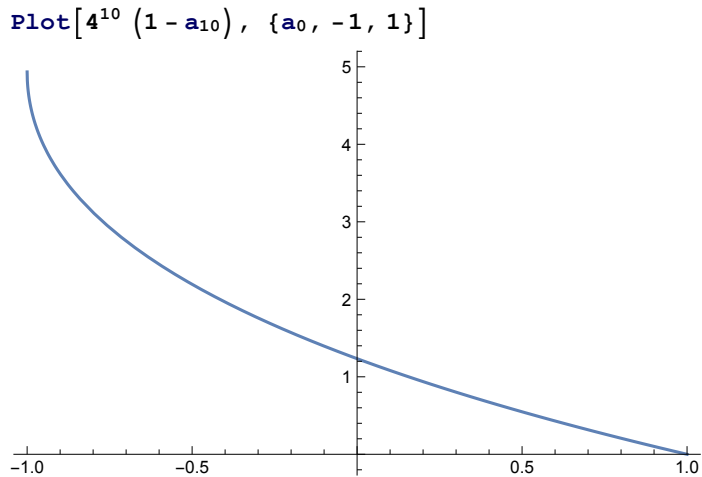
a0 = 0.5; a_n_ :=  $\left(\frac{1 + a_{n-1}}{2}\right)^{1/2}$ ;
Table[a_n, {n, 0, 10}] // Print;
Table[4^n (1 - a_n), {n, 0, 10}] // Print;
{0.5, 0.866025, 0.965926, 0.991445, 0.997859,
 0.999465, 0.999866, 0.999967, 0.999992, 0.999998, 0.999999}
{0.5, 0.535898, 0.545187, 0.547529, 0.548116,
 0.548262, 0.548299, 0.548308, 0.548311, 0.548311, 0.548311}

```

```

a0 = 1./3; a_n_ :=  $\left(\frac{1 + a_{n-1}}{2}\right)^{1/2}$ ;
Table[a_n, {n, 0, 10}] // Print;
Table[4^n (1 - a_n), {n, 0, 10}] // Print;
{0.333333, 0.816497, 0.953021, 0.988185, 0.997042,
 0.99926, 0.999815, 0.999954, 0.999988, 0.999997, 0.999999}
{0.666667, 0.734014, 0.75167, 0.756137, 0.757257,
 0.757537, 0.757607, 0.757625, 0.757629, 0.75763, 0.75763}

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Sum[ $\frac{D[\text{Cos}[\alpha], \{\alpha, n\}]}{n!}$  /.  $\alpha \rightarrow 0$  x^n, {n, 0, 6}]

```

$$1 - \frac{x^2}{2} + \frac{x^4}{24} - \frac{x^6}{720}$$

$$f[x_] := \frac{\text{ArcCos}[x]^2}{2}$$

```

{f[0.5], f[1./3]}
{0.548311, 0.757631}

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Plot[f[x], {x, -1, 1}]
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