

In[1]:= **Table**[{**n**, $(0.5)^{(n+1)} / (n+1) - 10^{(-6)}$ }, {**n**, 1, 20}]

Out[1]= {{1, 0.124999}, {2, 0.0416657}, {3, 0.015624}, {4, 0.006249}, {5, 0.00260317},
 {6, 0.00111507}, {7, 0.000487281}, {8, 0.000216014}, {9, 0.0000966563},
 {10, 0.0000433892}, {11, 0.0000193451}, {12, 8.39002×10^{-6} }, {13, 3.35965×10^{-6} },
 {14, 1.03451×10^{-6} }, {15, -4.63257×10^{-8} }, {16, -5.51212×10^{-7} }, {17, -7.88072×10^{-7} },
 {18, -8.99613×10^{-7} }, {19, -9.52316×10^{-7} }, {20, -9.77293×10^{-7} }}

In[2]:= **T**[**n**_, **x**_] := **Sum**[$(-1)^{(k-1)} (x)^k / k$, {**k**, 1, **n**}]

In[3]:= **T**[15, 1 / 2]

Out[3]= $\frac{59848147}{147603456}$

In[4]:= **N**[% , 20]

Out[4]= 0.40546575684515137640

In[5]:= **N**[**Log**[1 + 1 / 2], 20]

Out[5]= 0.40546510810816438198

In[6]:= %% - %

Out[6]= $6.4873698699442 \times 10^{-7}$

In[7]:= **Table**[{**n**, $2(0.8)^n - 10^{(-6)}$ }, {**n**, 1, 70}]

Out[7]= {{1, 1.6}, {2, 1.28}, {3, 1.024}, {4, 0.819199}, {5, 0.655359}, {6, 0.524287},
 {7, 0.419429}, {8, 0.335543}, {9, 0.268434}, {10, 0.214747}, {11, 0.171798},
 {12, 0.137438}, {13, 0.10995}, {14, 0.0879599}, {15, 0.0703677}, {16, 0.056294},
 {17, 0.045035}, {18, 0.0360278}, {19, 0.028822}, {20, 0.0230574}, {21, 0.0184457},
 {22, 0.0147564}, {23, 0.0118049}, {24, 0.00944373}, {25, 0.00755479}, {26, 0.00604363},
 {27, 0.0048347}, {28, 0.00386756}, {29, 0.00309385}, {30, 0.00247488},
 {31, 0.0019797}, {32, 0.00158356}, {33, 0.00126665}, {34, 0.00101312},
 {35, 0.000810296}, {36, 0.000648037}, {37, 0.00051823}, {38, 0.000414384},
 {39, 0.000331307}, {40, 0.000264846}, {41, 0.000211676}, {42, 0.000169141},
 {43, 0.000135113}, {44, 0.00010789}, {45, 0.0000861123}, {46, 0.0000686898},
 {47, 0.0000547519}, {48, 0.0000436015}, {49, 0.0000346812}, {50, 0.000027545},
 {51, 0.000021836}, {52, 0.0000172688}, {53, 0.000013615}, {54, 0.000010692},
 {55, 8.35361×10^{-6} }, {56, 6.48289×10^{-6} }, {57, 4.98631×10^{-6} }, {58, 3.78905×10^{-6} },
 {59, 2.83124×10^{-6} }, {60, 2.06499×10^{-6} }, {61, 1.45199×10^{-6} }, {62, 9.61594×10^{-7} },
 {63, 5.69275×10^{-7} }, {64, 2.5542×10^{-7} }, {65, 4.33628×10^{-9} }, {66, -1.96531×10^{-7} },
 {67, -3.57225×10^{-7} }, {68, -4.8578×10^{-7} }, {69, -5.88624×10^{-7} }, {70, -6.70899×10^{-7} }}

In[8]:= **T**[66, -8 / 10]

Out[8]= -16117216873691934804806620772027796322209555314759992463642416990260604 /
 10014190032827718657639678155081564003836547271930612623691558837890625

In[9]:= **N**[% , 20]

Out[9]= -1.6094378897202630032

In[10]:= **N**[**Log**[1 - 8 / 10], 20]

Out[10]= -1.6094379124341003746

In[11]:= %% - %

Out[11]= $2.27138373714 \times 10^{-8}$

In[12]:= **Integrate** $\left[\frac{1}{1+t} \left(\frac{t-x}{t+1}\right)^n, \{t, x, 0\}\right]$

Out[12]= **If** $\left[\text{Re}[n] > -1 \ \&\& \ (x \notin \text{Reals} \ || \ \text{Re}[x] \geq -1), \frac{(-x)^{1+n} \text{Hypergeometric2F1}\left[1, 1, 2+n, \frac{x}{1+x}\right]}{1+n+x+n x},\right.$

$\left. \text{Integrate}\left[\frac{\left(\frac{t-x}{1+t}\right)^n}{1+t}, \{t, x, 0\}, \text{Assumptions} \rightarrow !(\text{Re}[n] > -1 \ \&\& \ (x \notin \text{Reals} \ || \ \text{Re}[x] \geq -1))\right]\right]$

In[13]:= **R** $[n_, x_] := \frac{(-x)^{1+n} \text{Hypergeometric2F1}\left[1, 1, 2+n, \frac{x}{1+x}\right]}{1+n+x+n x}$

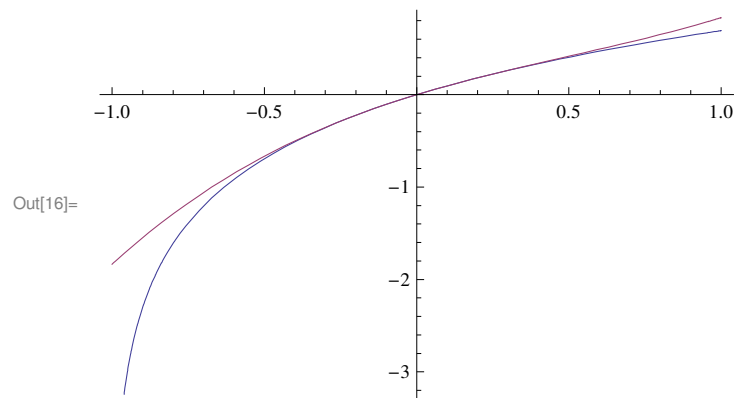
In[14]:= **N** $[R[66, -8/10], 20]$

Out[14]= $2.2713837371389864372 \times 10^{-8}$

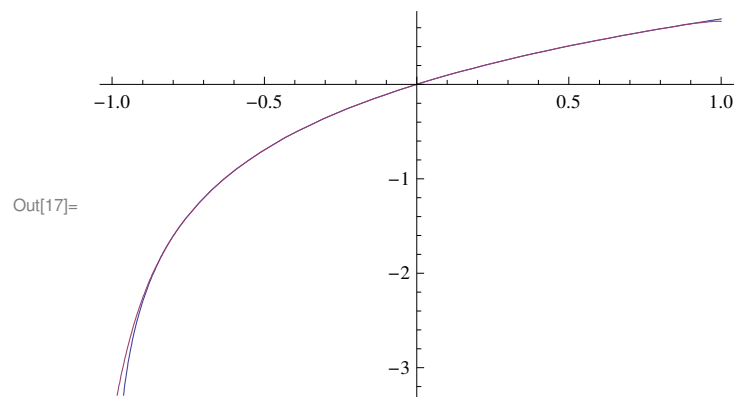
In[15]:= **NIntegrate** $\left[\frac{1}{1+t} \left(\frac{t+0.8}{t+1}\right)^{66}, \{t, -0.8, 0\}\right]$

Out[15]= 2.27138×10^{-8}

In[16]:= **Plot** $[\{\text{Log}[1+x], T[3, x]\}, \{x, -1, 1\}]$



In[17]:= **Plot** $[\{\text{Log}[1+x], T[20, x]\}, \{x, -1, 1\}]$



In[18]:= **Plot** $[\{\text{Log}[1+x], \text{Table}[T[n, x], \{n, 1, 20\}]\}, \{x, -2, 2\}]$

