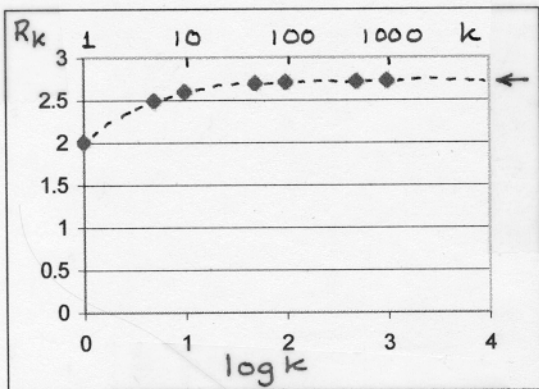


# Homework #1 -- ans --

1.)  $R_k = \left(1 + \frac{1}{k}\right)^k$

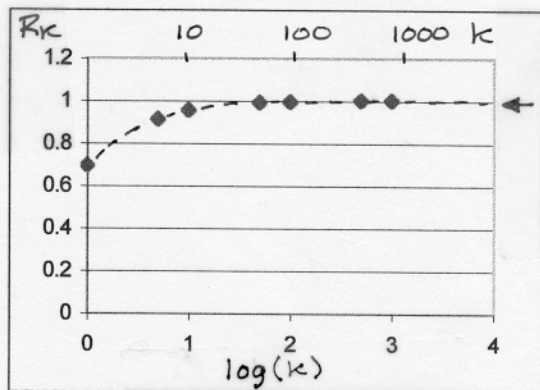
k	log(k)	$R_k$
1	0	2
5	0.69897	2.48832
10	1	2.593742
50	1.69897	2.691588
100	2	2.704814
500	2.69897	2.715569
1000	3	2.716924



$L = e$   
 $= 2.718$

3.)  $R_k = k \cdot \ln\left(\frac{k+1}{k}\right)$

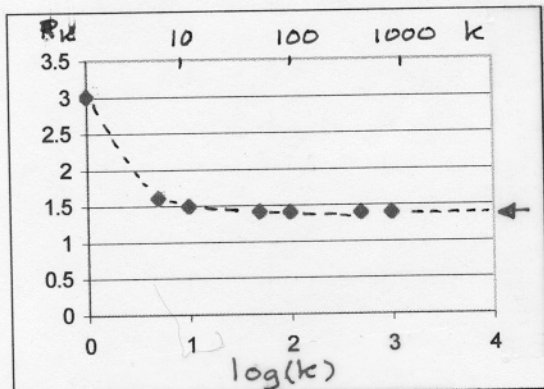
k	log(k)	$R_k$
1	0	0.693147
5	0.69897	0.911608
10	1	0.953102
50	1.69897	0.990131
100	2	0.995033
500	2.69897	0.999001
1000	3	0.9995



$L = 1$

2.)  $R_k = \frac{4^{1/k} - 1}{(1/k)}$

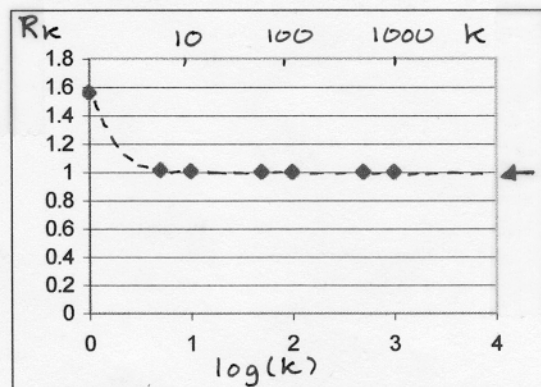
k	log(k)	$R_k$
1	0	3
5	0.69897	1.59754
10	1	1.486984
50	1.69897	1.405691
100	2	1.395948
500	2.69897	1.388218
1000	3	1.387256



$L = \ln(4)$   
 $= 1.386$

4.)  $R_k = \tan(1/k) / (1/k)$

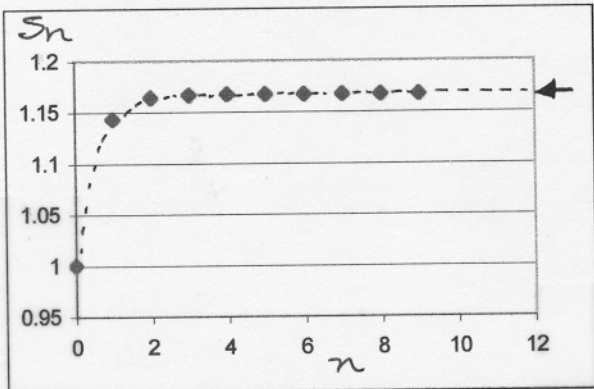
k	log(k)	$R_k$
1	0	1.557408
5	0.69897	1.01355
10	1	1.003347
50	1.69897	1.000133
100	2	1.000033
500	2.69897	1.000001
1000	3	1



$L = 1$

$$5.) S_n = \sum_{k=0}^n \left(\frac{1}{7}\right)^k$$

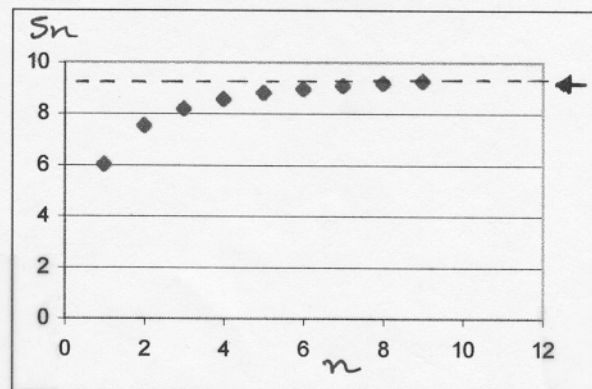
$n$	$t_n$	$S_n$
0	1	1
1	0.142857	1.142857
2	0.020408	1.163265
3	0.002915	1.166181
4	0.000416	1.166597
5	5.95E-05	1.166657
6	8.5E-06	1.166665
7	1.21E-06	1.166666
8	1.73E-07	1.166667
9	2.48E-08	1.166667
10	3.54E-09	1.166667



$$L = \frac{7}{6}$$

$$7.) S_n = \sum_{k=1}^n \left(\frac{6}{k^2}\right)$$

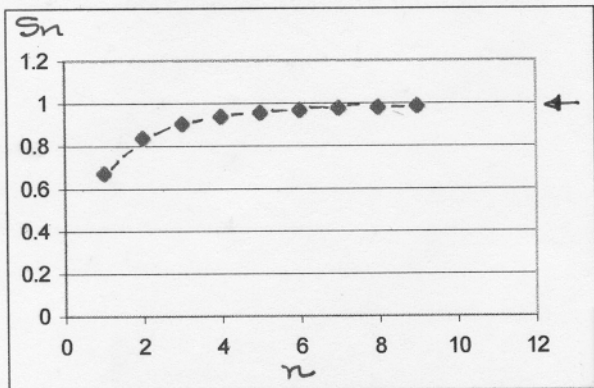
$n$	$t_n$	$S_n$
1	6	6
2	1.5	7.5
3	0.666667	8.166667
4	0.375	8.541667
5	0.24	8.781667
6	0.166667	8.948333
7	0.122449	9.070782
8	0.09375	9.164532
9	0.074074	9.238606
10	0.06	9.298606



$$L = \pi^2 = 9.87$$

$$8.) S_n = \sum_{k=1}^n \frac{4}{k(k+1)(k+2)}$$

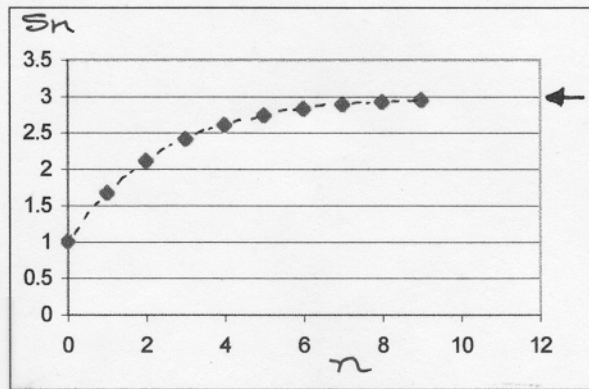
$n$	$t_n$	$S_n$
1	0.666667	0.666667
2	0.166667	0.833333
3	0.066667	0.9
4	0.033333	0.933333
5	0.019048	0.952381
6	0.011905	0.964286
7	0.007937	0.972222
8	0.005556	0.977778
9	0.00404	0.981818
10	0.00303	0.984848



$$L = 1$$

$$6.) S_n = \sum_{k=0}^n \left(\frac{2}{3}\right)^k$$

$n$	$t_n$	$S_n$
0	1	1
1	0.666667	1.666667
2	0.444444	2.111111
3	0.296296	2.407407
4	0.197531	2.604938
5	0.131687	2.736626
6	0.087791	2.824417
7	0.058528	2.882945
8	0.039018	2.921963
9	0.026012	2.947975
10	0.017342	2.965317



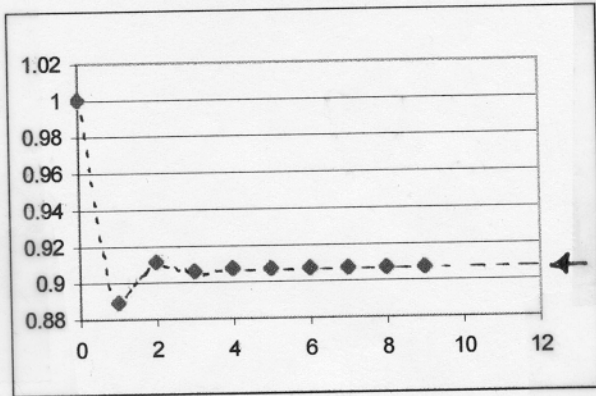
$$L = 3$$

Hmwk #1

(cont'd)

$$9. S_n = \sum_{k=0}^n (-1)^k \frac{1}{(2k+1)3^k}$$

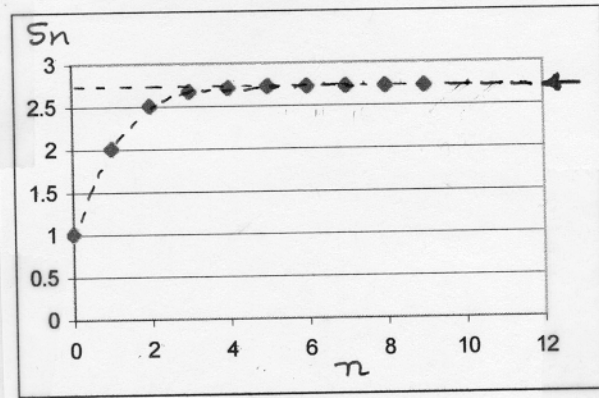
n	t <sub>n</sub>	S <sub>n</sub>
0	1	1
1	-0.11111	0.888889
2	0.022222	0.911111
3	-0.00529	0.90582
4	0.001372	0.907192
5	-0.00037	0.906818
6	0.000106	0.906923
7	-3E-05	0.906893
8	8.97E-06	0.906902
9	-2.7E-06	0.906899
10	8.06E-07	0.9069



$$L = \frac{\sqrt{3}}{6} \pi = 0.9069$$

$$10.) S_n = \sum_{k=0}^n \left(\frac{1}{k!}\right)$$

n	t <sub>n</sub>	S <sub>n</sub>
0	1	1
1	1	2
2	0.5	2.5
3	0.166667	2.666667
4	0.041667	2.708333
5	0.008333	2.716667
6	0.001389	2.718056
7	0.000198	2.718254
8	2.48E-05	2.718279
9	2.76E-06	2.718282
10	2.76E-07	2.718282



$$L = e = 2.718282...$$