Sequence (1B)

- Statistical Estimation
- Arithmetic Progression Examples
- Geometric Progression Examples
- Harmonic Progression Examples
- Partial Sum and Area

Please send corrections (or suggestions) to youngwlim@hotmail.com.

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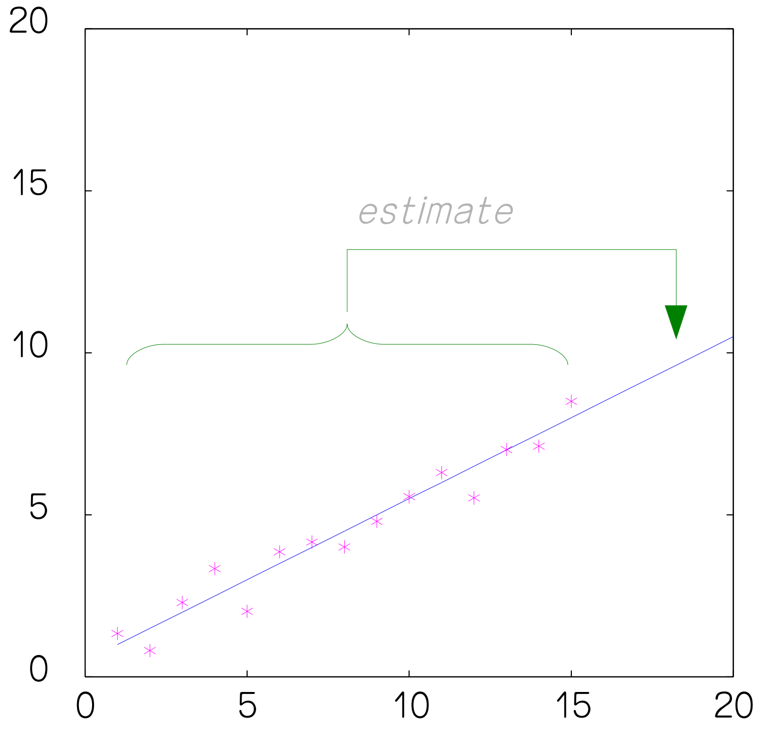
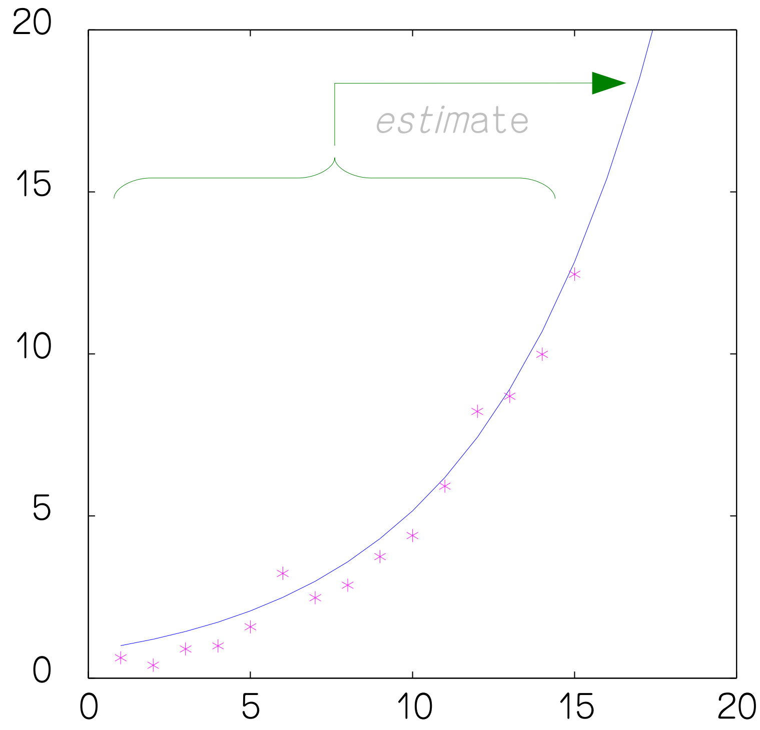
Statistical Estimation

Linear Model

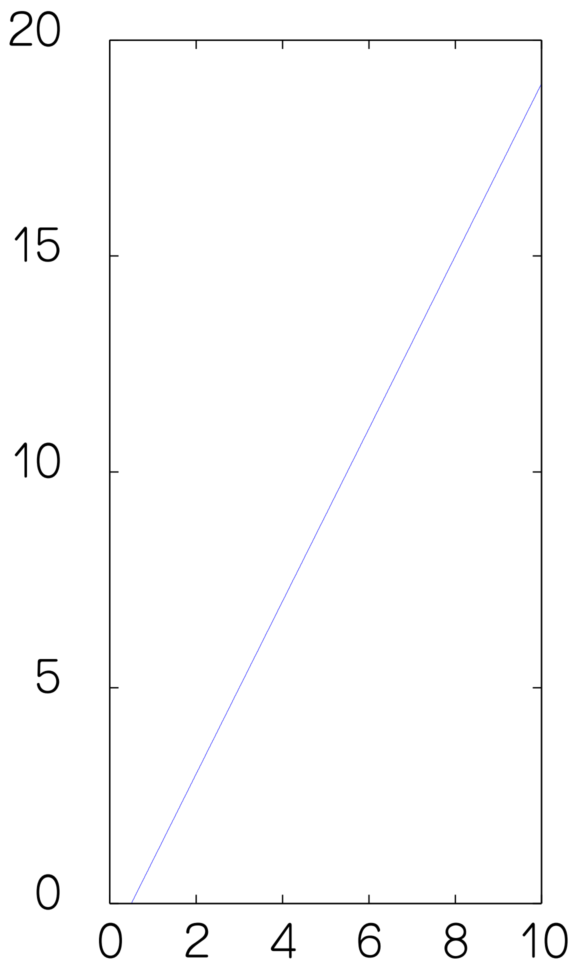


Exponential Model

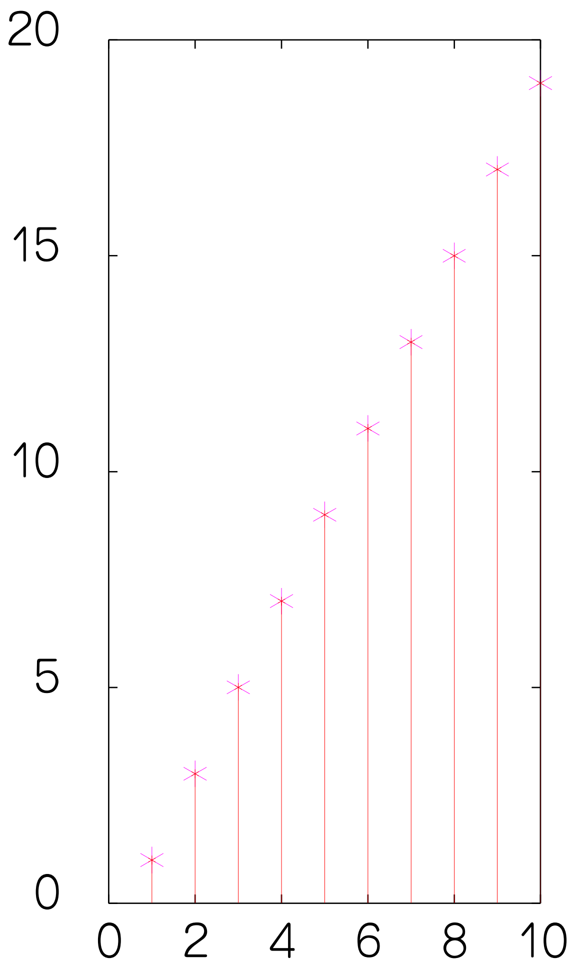


Arithmetic Progression (1)

$y=1+(x-1)\cdot 2$ (Continuous)

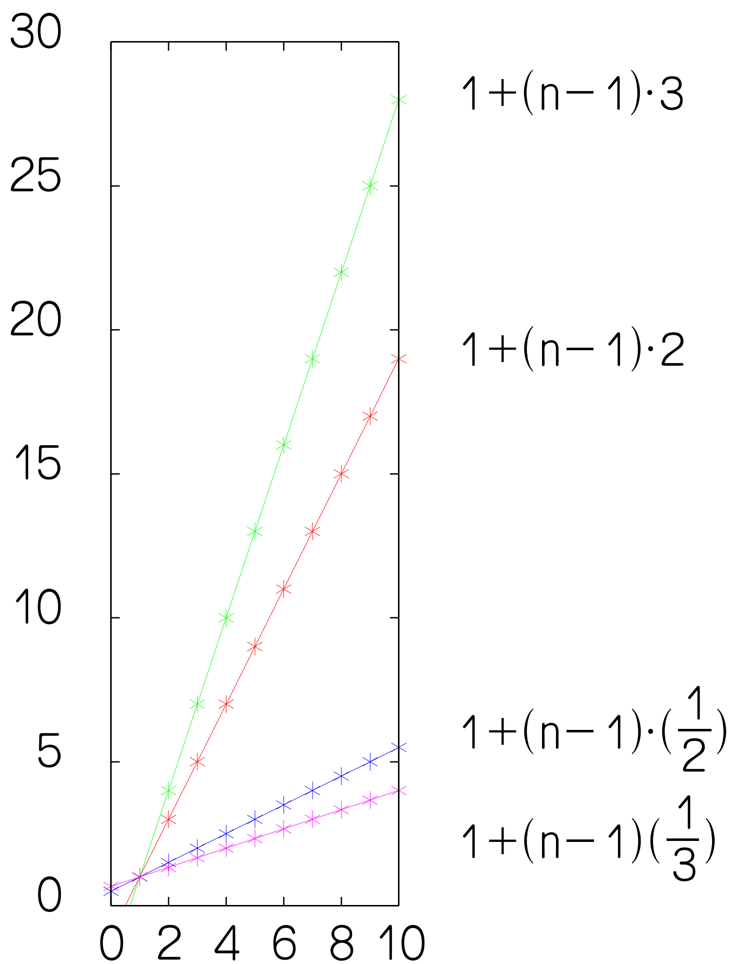


$a_n=1+(n-1)\cdot 2$ (Discrete)

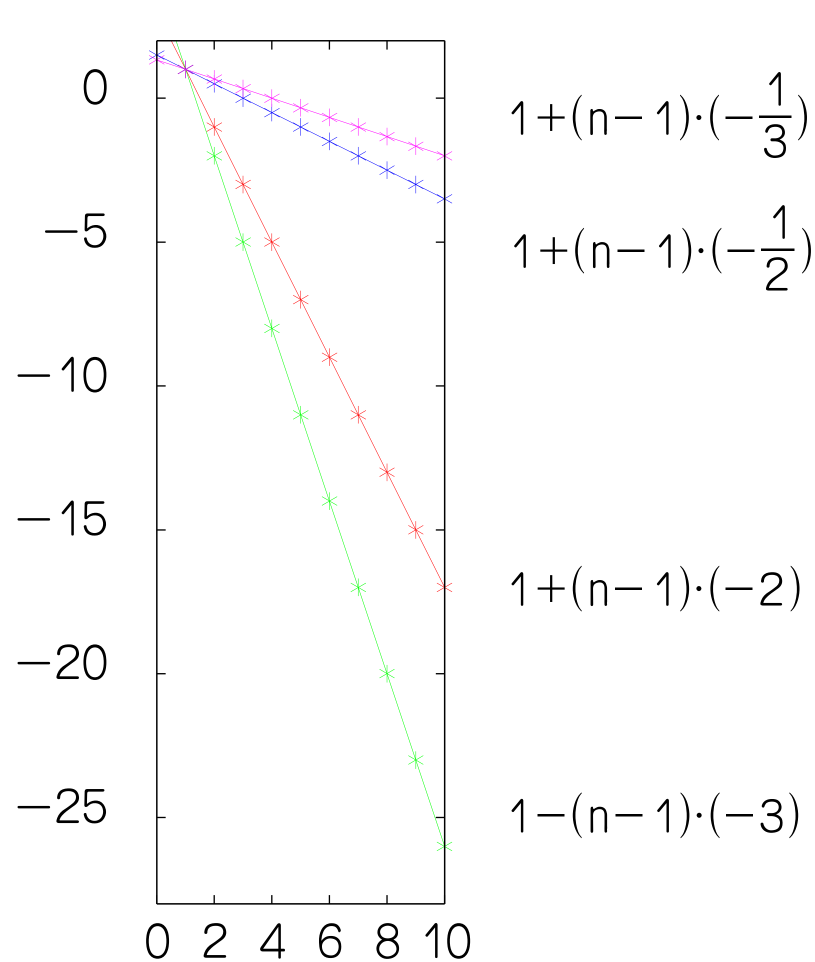


Arithmetic Progression (2)

$a_n = a + (n-1) \cdot d$ **(d > 0)**

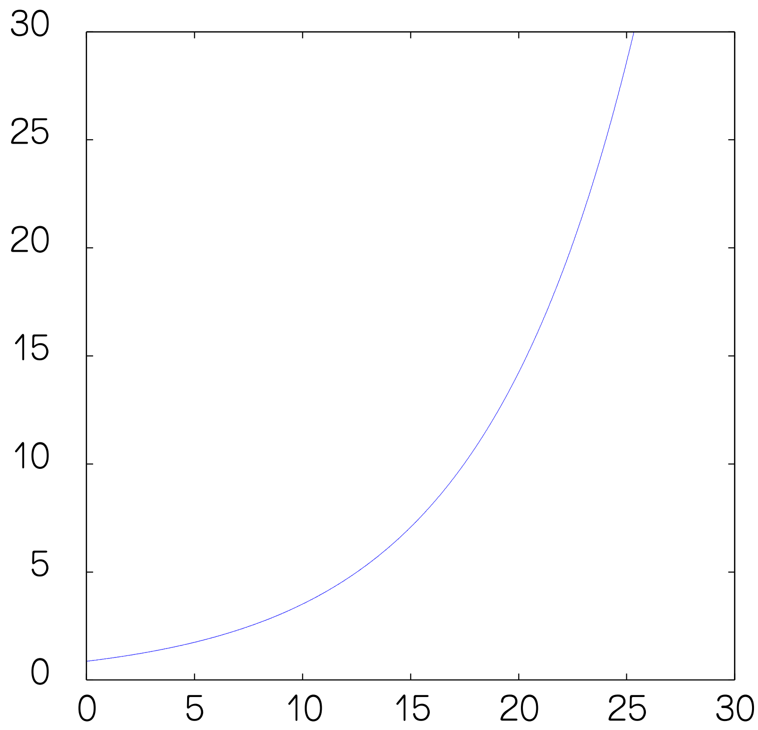


$a_n = a + (n-1) \cdot d$ **(d < 0)**

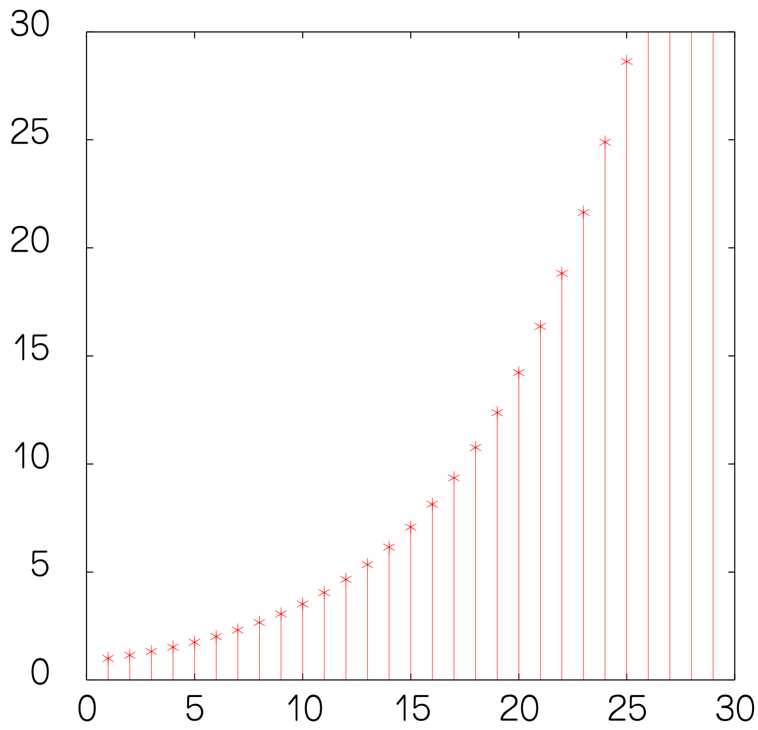


Geometric Progression (1)

$y = 1 \cdot (1.15)^{x-1}$ (Continuous)

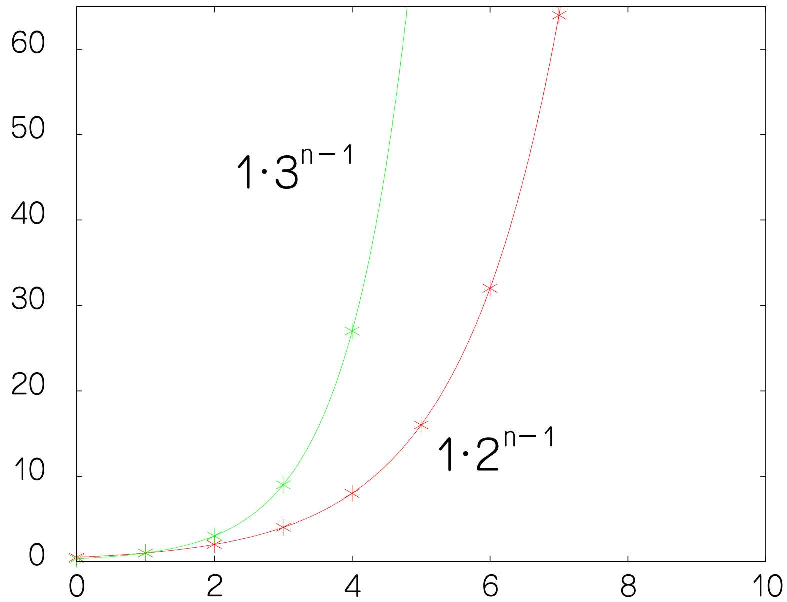


$a_n = 1 \cdot (1.15)^{n-1}$ (Discrete)

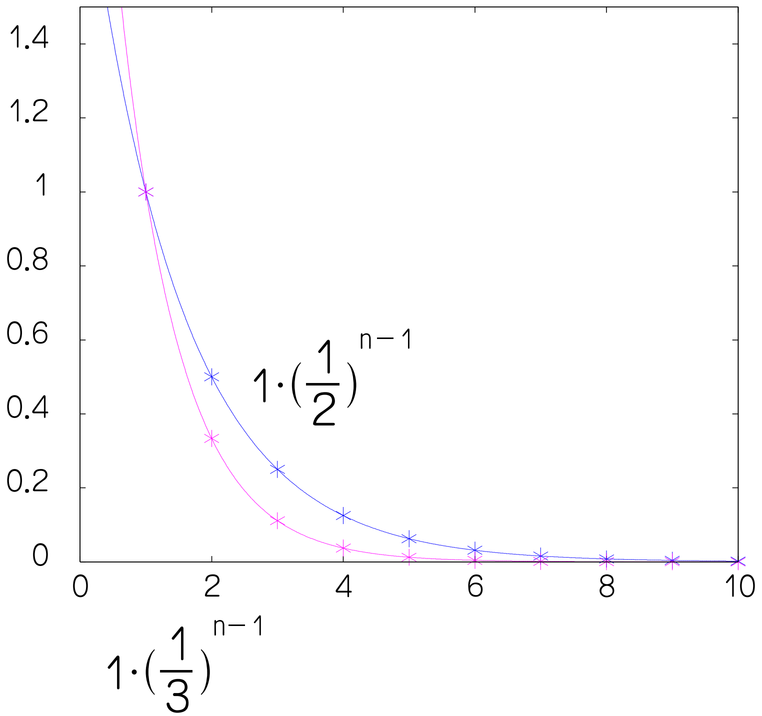


Geometric Progression (2)

$0 < a, \ 1 < r$

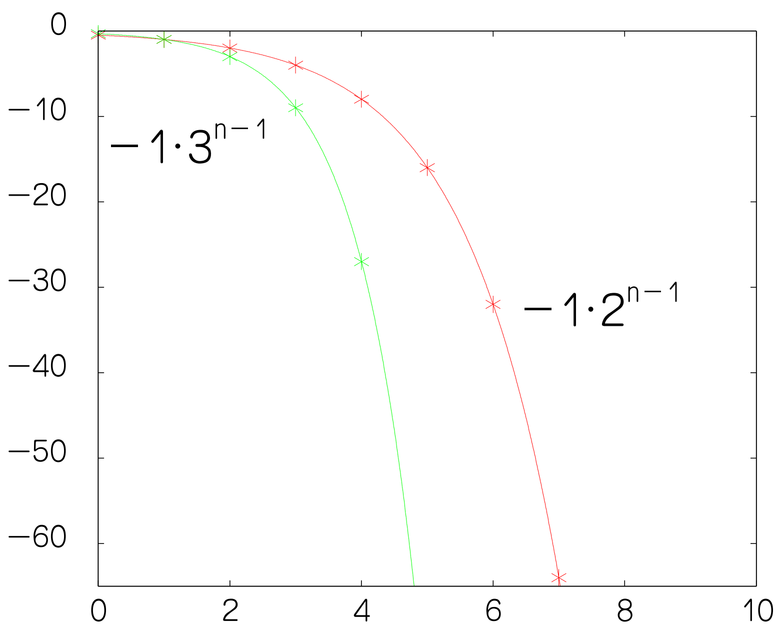


$0 < a, \ 0 < r < 1$

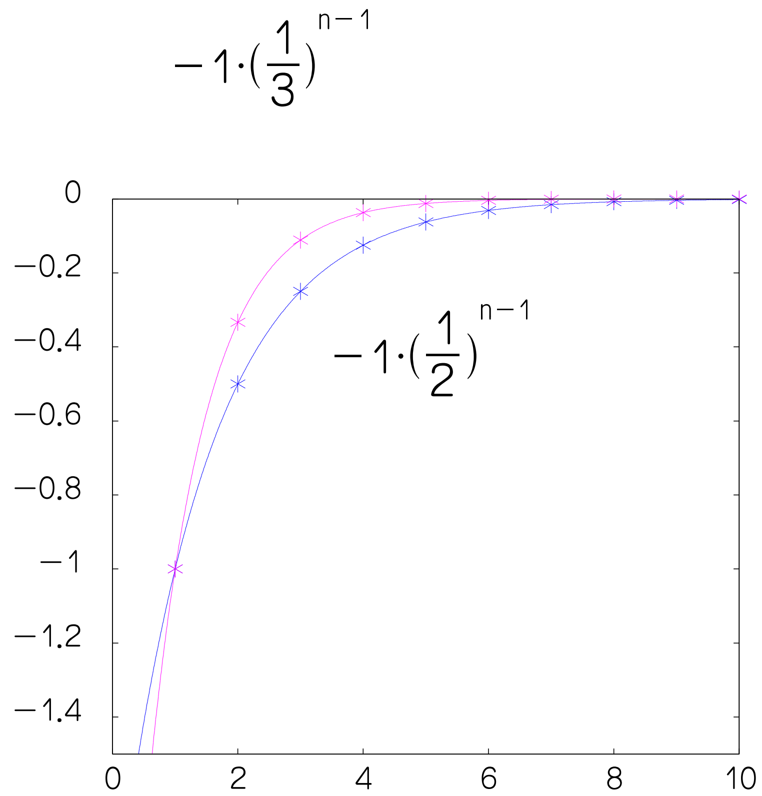


Geometric Progression (3)

$0 < a$, $1 < r$



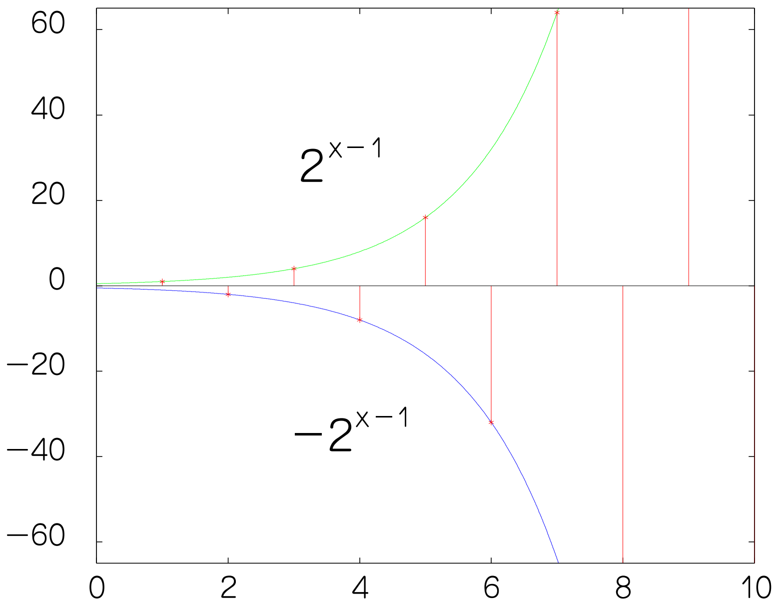
$0 < a$, $0 < r < 1$

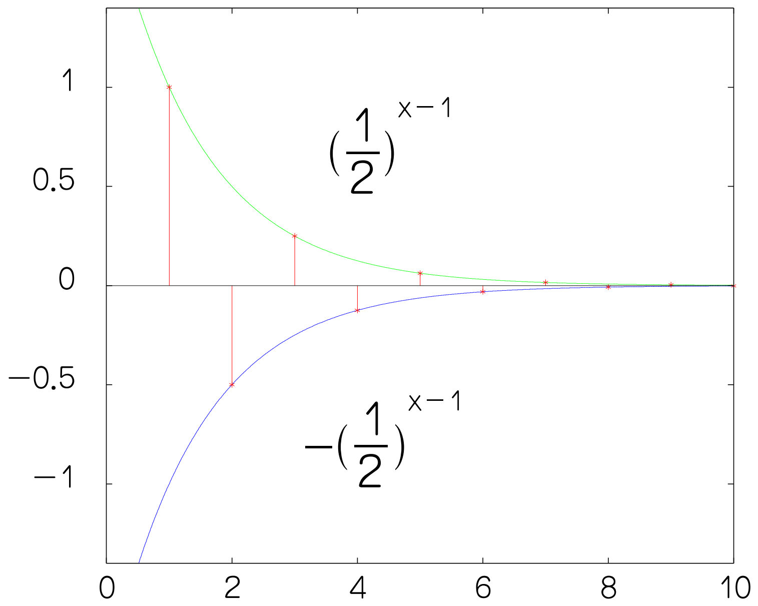


Geometric Progression (4)

$0 < a,\ r < -1 \quad 1\cdot(-2)^{n-1}$

$0 < a,\ -1 < r < 0 \quad 1\cdot(-\frac{1}{2})^{n-1}$



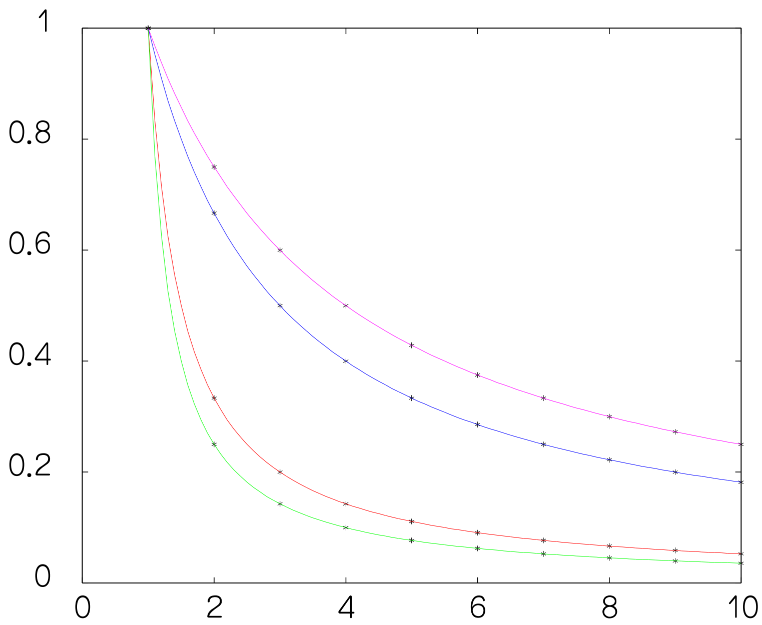


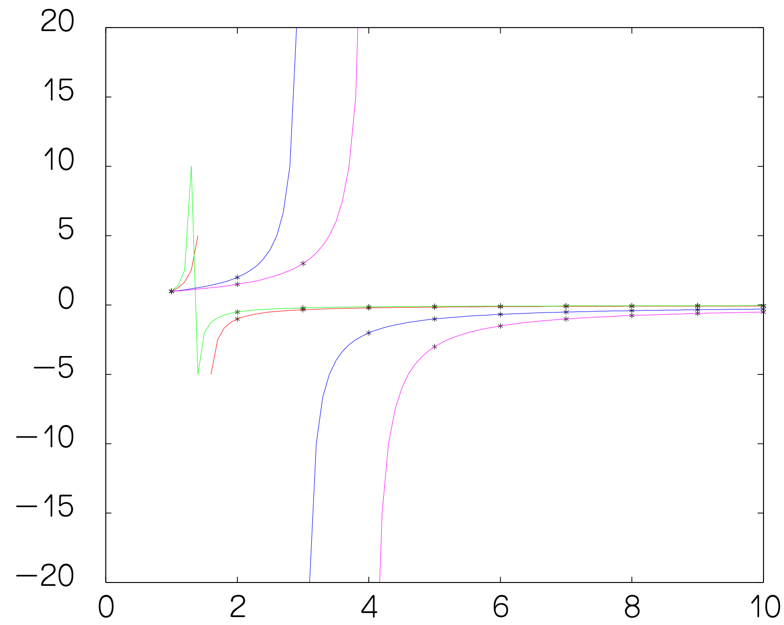
Geometric Sequence: 2^n

n	2^n	n	2^n	n	2^n
0	1	10	1024	20	1048576
1	2	11	2048	21	2097152
2	4	12	4096	22	4194304
3	8	13	8192	23	8388608
4	16	14	16384	24	16777216
5	32	15	32768	25	33554432
6	64	16	65536	26	67108864
7	128	17	131072	27	134217728
8	256	18	262144	28	268435456
9	512	19	524288	29	536870912
10	1024	20	1048576	30	1073741824
	$\approx 10^3 = 1K$		$\approx 10^6 = 1M$		$\approx 10^9 = 1G$

Harmonic Progression

Infinity (denominator = 0)





$1 \ / \ \{1+(n-1)\cdot(\frac{1}{3})\}$

$1 \ / \ \{1+(n-1)(\frac{1}{2})\}$

$1 \ / \ \{1+(n-1)\cdot 2\}$

$1 \ / \ \{1+(n-1)\cdot 3\}$

$1 \ / \ \{1-(n-1)\cdot(-3)\}$

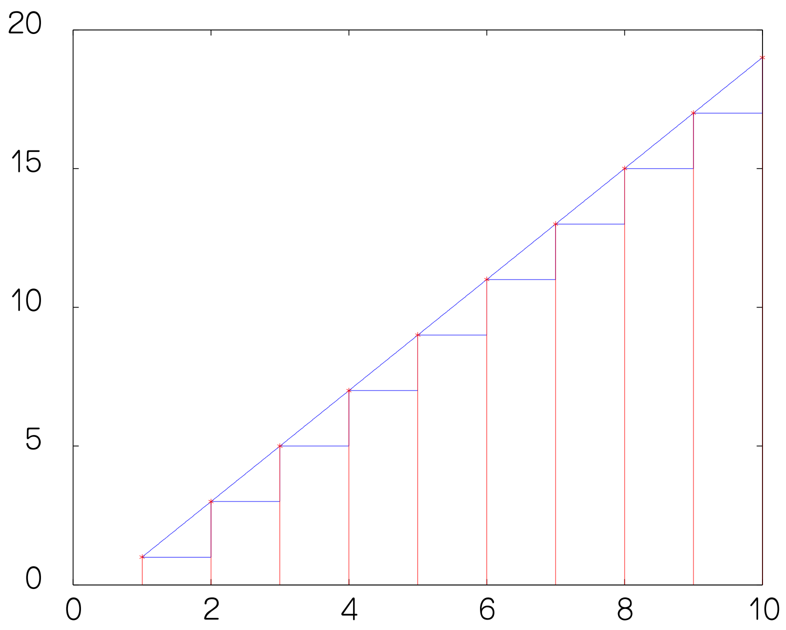
$1 \ / \ \{1+(n-1)\cdot(-2)\}$

$1 \ / \ \{1+(n-1)\cdot(-\frac{1}{2})\}$

$1 \ / \ \{1+(n-1)\cdot(-\frac{1}{3})\}$

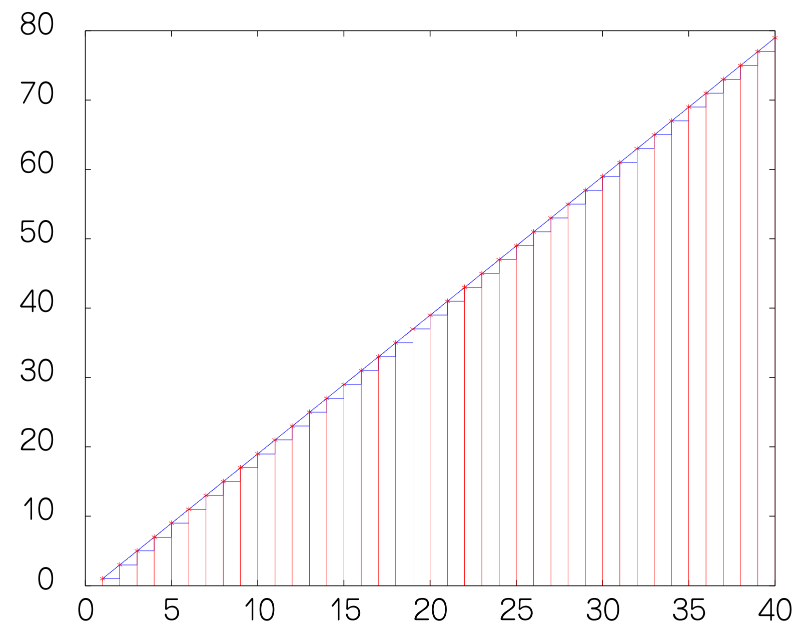
Partial Sum of A.P.

$a_n = 1 + (n-1) \cdot 2$



$$S_{10} = \sum_{k=1}^{10} 1 \cdot a_k \approx \text{Area}$$

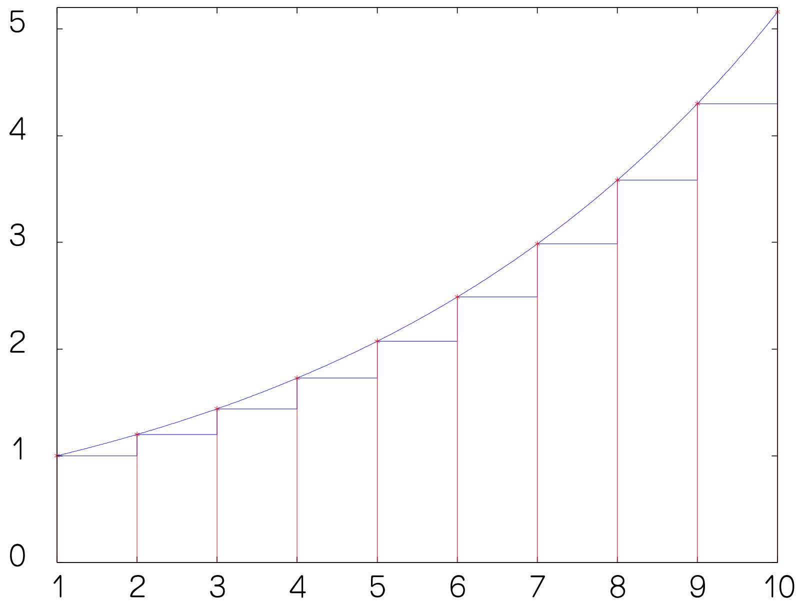
$a_n = 1 + (n-1) \cdot 2$



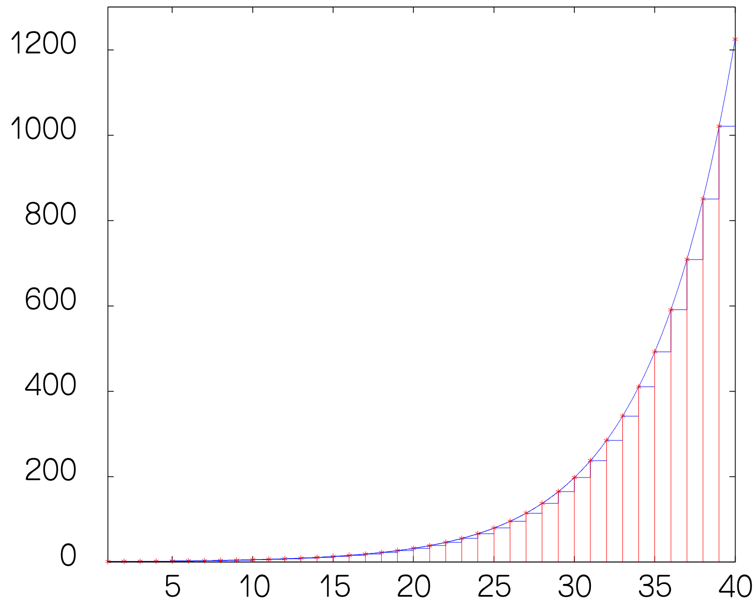
$$S_{40} = \sum_{k=1}^{40} 1 \cdot a_k \approx \text{Area}$$

Partial Sum of G.P.

$a_n = 1 \cdot 2^{n-1}$



$a_n = 1 \cdot 2^{n-1}$



$$S_{10} = \sum_{k=1}^{10} 1 \cdot a_k \approx \text{Area}$$

$$S_{40} = \sum_{k=1}^{40} 1 \cdot a_k \approx \text{Area}$$

References

[1] http://en.wikipedia.org/
[2] http://planetmath.org/
[3] Blitzer, R. “Algebra & Trigonometry.” 3rd ed, Prentice Hall
[4] Smith, R. T., Minton, R. B. “Calculus: Concepts & Connections,” Mc Graw Hill
[5] 홍성대, “기본/실력 수학의 정석,” 성지출판