1 $\log_2(x)^{\log_2(x)}$

2 $\frac{x}{\log_2(x)}$

3 $x^{\log_2(x)}$

4 $x\left(\log_2(x)\right)^3$

5

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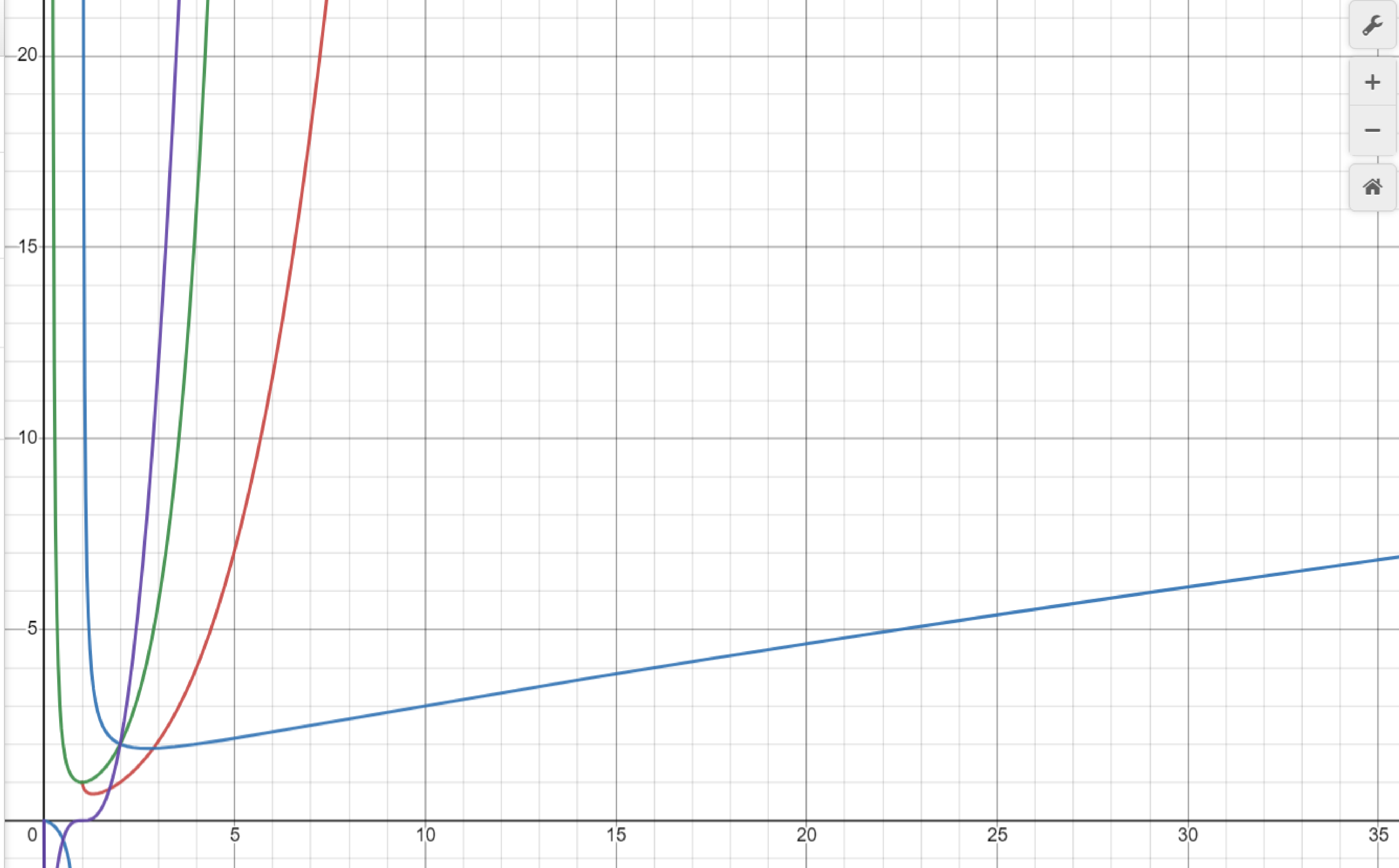
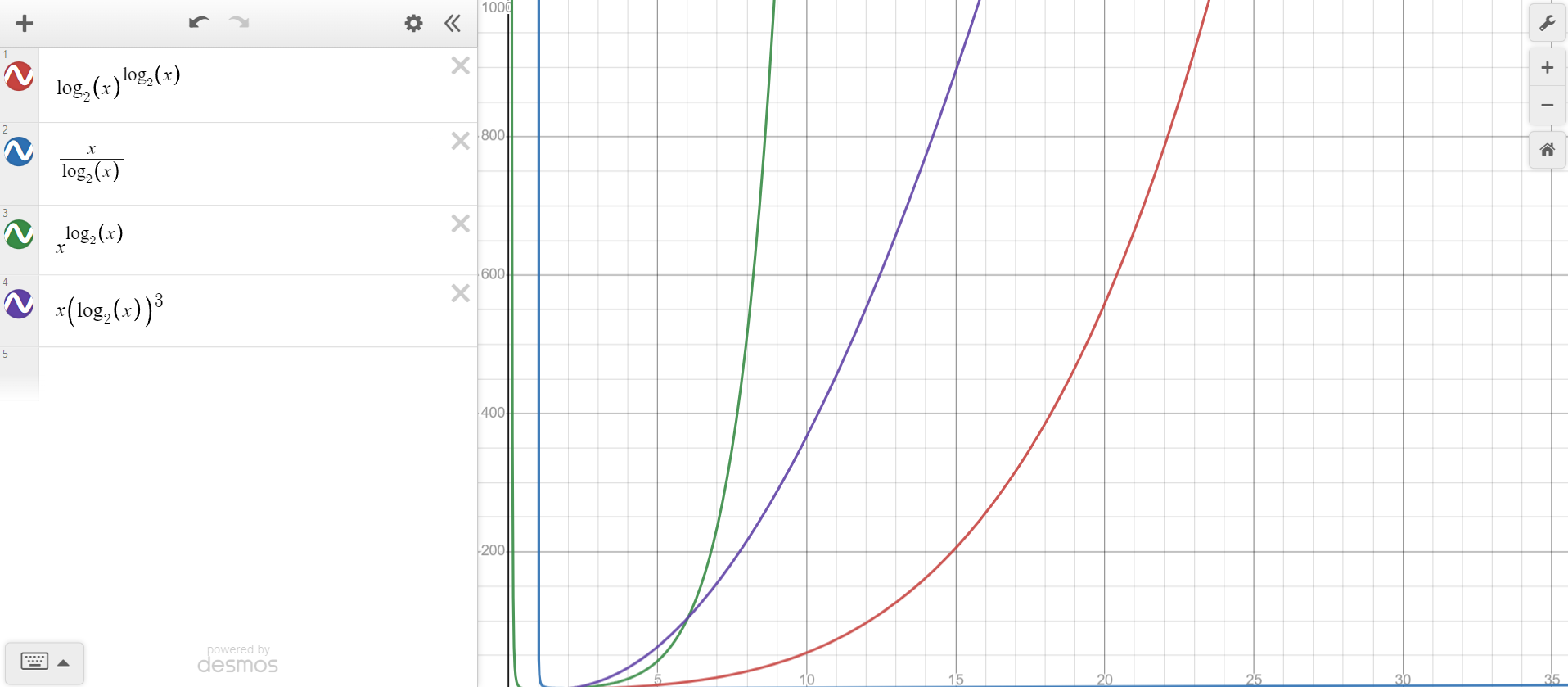



1
$\log_2(x)^{\log_2(x)}$
2
$\frac{x}{\log_2(x)}$
3
$x^{\log_2(x)}$
4
$x(\log_2(x))^3$
5
powered by
desmos
1000
800
600
400
200
5
10
15
20
25
30
35

1) $\lim_{n\to\infty} \frac{n/\log_2(n)}{(\log_2(n))^{\log_2(n)}} = \lim_{n\to\infty} \frac{n}{\log_2 n \cdot \log_2 n^{\log_2 n}}$

$\lim_{n\to\infty} \frac{1}{\log_2(n)^{\log_2(n)-1}} = 0$

$\lim_{n\to\infty} \frac{(\log_2(n)^\wedge \log_2(n))}{n(\log_2(n))^\wedge 3} = \frac{\infty}{\infty} \overset{L'H}{\Rightarrow} \lim_{n\to\infty} \frac{\frac{2\ln(x)}{\ln^2(2)x}}{\log_2(x)^3 + \frac{3\log_2(x)^2}{\ln(2)}} = \frac{2\ln(x)}{\ln(2)x(\log_2(x)^3 + \frac{3\log_2(x)^2}{\ln(2)})}$

$= 0$

$\lim_{n\to\infty} \frac{n(\log_2(n))^\wedge 3}{n^{\log_2(n)}} = \lim_{n\to\infty} \frac{n}{n^{\log_2(n)}} = \lim_{n\to\infty} \frac{1}{n^{\log_2(n)-1}} = 0$

$g_2 < g_1 < g_4 < g_3$

g_4 passes g_2, & g_3 at (2, 2). g_3 passes g_2 at (2, 2)
g_1 passes g_2 at (2.566, 1.887) g_3 passe g_4 at (6.022, 104.667)

2) S is always first, E is always last

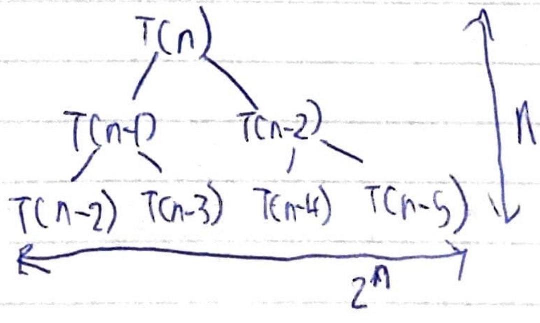
~~S, A, B, C, D, E~~

S, C, A, B, D, E

1 ordering

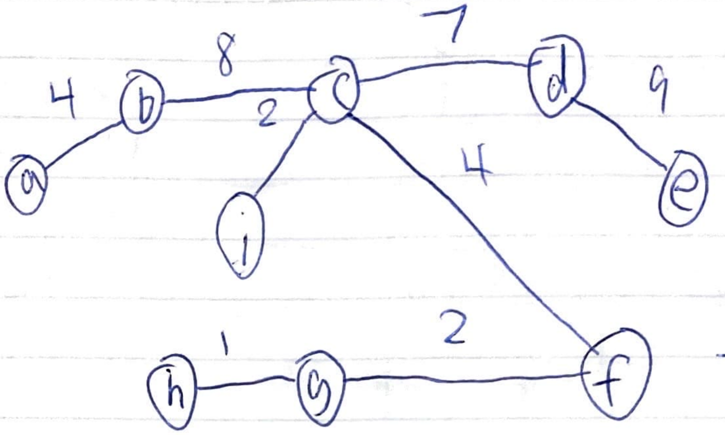
~~S, A, C, B, D, E~~

3) $T(n) = T(n-1) + T(n-2) + C$
$T(n) = (T(n-2) + T(n-3) + C) + (T(n-3) + T(n-4)) + C$



$\boxed{O(2^n)}$

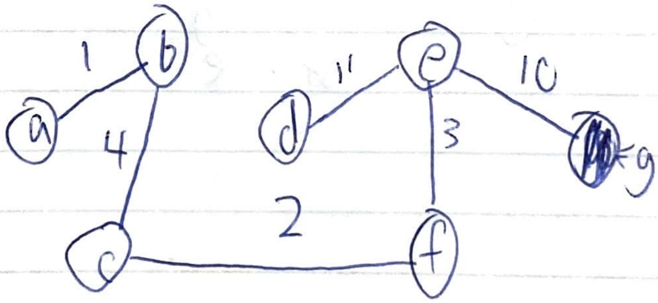
4) ~~h<->g 1~~
~~g<->f 2~~
~~i<->c 2~~
~~a<->b 4~~
~~c<->f 4~~
~~i<->g 6~~
~~h<->i 7~~
~~c<->d 7~~
~~b<->c 8~~
~~a<->h 8~~
~~d<->e 9~~
~~f<->e 10~~
~~b<->h 11~~
~~d<->f 14~~



$\boxed{37}$

edge	value
h<->g	1
g<->f	2
c<->i	2
a<->b	4
f<->c	4
c<->d	7
b<->c	8
d<->e	9

5)



$\boxed{31}$

edge	value
a<->b	1
c<->f	2
e<->f	3
b<->c	4
e<->g	10
d<->e	11

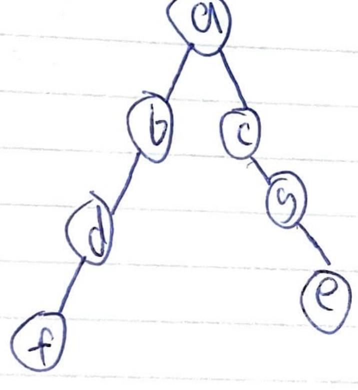
a)

	a	b	c	d	e	f	g
a	0	1	1	1	1	0	0
b	1	0	0	1	0	1	0
c	1	0	0	0	0	0	1
d	1	1	0	0	0	1	0
e	1	0	0	0	0	0	1
f	0	1	0	1	0	0	0
g	0	0	1	0	1	0	0

list

a → b, c, d, e
b → a, d, f
c → a, g
d → a, b, f
e → a, g
f → b, d
g → c, e

b)



order

first: a
b
d
f
c
g
last: e