Name:- Ayesha Khalid Ag. No:- 2022-ag-2403.

The slop work be
$b = 2.1$

How to estimate "a"
we know b

$$T(N) = aN^b$$

$N = 8000$

N	Time (sec)
8000	152.365
8000	151.275
8000	152.170

$$152.170 = a(8000)^{2.1}$$

$$a = \frac{152.170}{157213183.3}$$

$$a = 0.000000\,96792$$

OR

$$a = 0.967 \times 10^{-6}.$$

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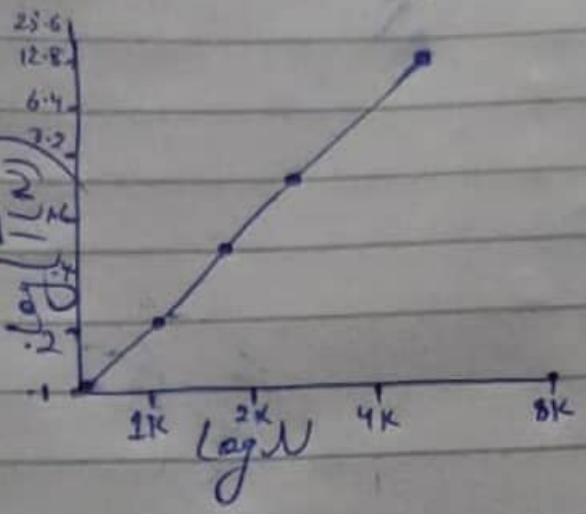
3 Sum Graphical.



N	Time (Sec)
1K	0.284
2K	2.263
4K	17.945
8K	152.365
16K	1377.883

$$\log(T(N)) = b \log N + C$$

$b = 2.999$

$C = 33.2103$

$T(N) = aN^b \quad a = 2^C$

$a = 2^{-33.2103}$

$$a = 1.0064 \times 10^{-10}$$

For

$N = 4000$

$T(N) = aN^b$

$17.800 = a(4000)^{2.1}$

$\frac{17.800}{36671272.62} = a$

$a = 0.000000463$

or

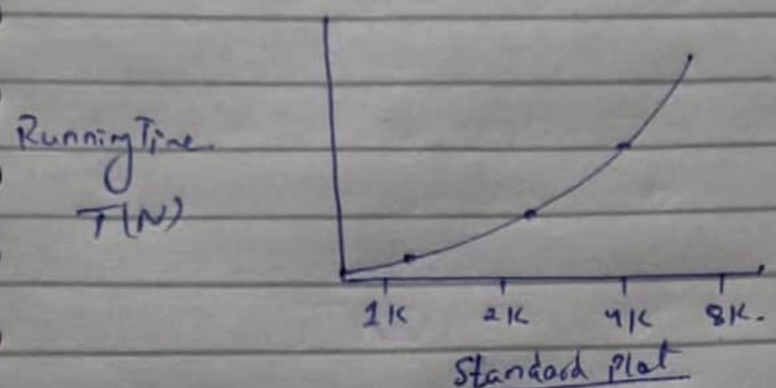
$a = 0.463 \times 10^{-6}$

N	T (sec)
4000	17.945
4000	18.002
4000	17.8000

Hypothesis

Ag. No = 2022-ag-2403

Running Time $= 0.97 \times 10^{-6} \times N^{2.1}$



Standard plot

Doubling Hypothesis:

N	Time (sec)	ratio	lgratio.
500	0	0	0
1000	0.284	0	0
2000	2.09	2.9	2.075
4000	17.945	7.929	2.070
8000	154.36	8.9900	2.13
16000	1377.68	9.043	2.20
32000	7727.48.	5.608	1.72

$$\frac{T(2N)}{T(N)} = \frac{a(2N)^b}{aN^b} = 2^b$$

→ lg (2.09 / 0.262) = 2.075

→ lg (17.945 / 2.09) = 2.070

→ lg (154.36 / 17825) = 2.13.

→ lg (1377.883 / 154.365) = 2.20.

→ lg (7727.48 / 1377.883) = 1.72.