Inverse square law of gamma radiation

Background radiation / counts per 5 mins = 78

Background radiation / Bq = 0.26

d/cm	counts/~~60s~~ 120s	count rate/Bq	Corrected count rate, C/Bq
3	4402	36.68	36.42
5	~~883~~ 1816	15.13	14.87
7	1002	8.35	8.09
10	462	3.85	3.59
12	346	2.88	2.62
14	290	2.42	2.16
16	230	1.92	1.66
18	146	1.22	0.96
20	156	1.30	1.04
25	124	1.03	0.77
30	76	0.63	0.37

log(d/cm)	log(C/Bq)
0.477	1.5613
0.699	1.1723
0.845	0.9079
1.000	0.555
1.079	0.418
1.146	0.334
1.204	0.220
1.255	~~-0.018~~ -0.0177
1.301	0.0170
1.398	-0.11
1.477	-0.43

$$C(d) = kd^n$$

$$\log C = \log k + n \log d$$

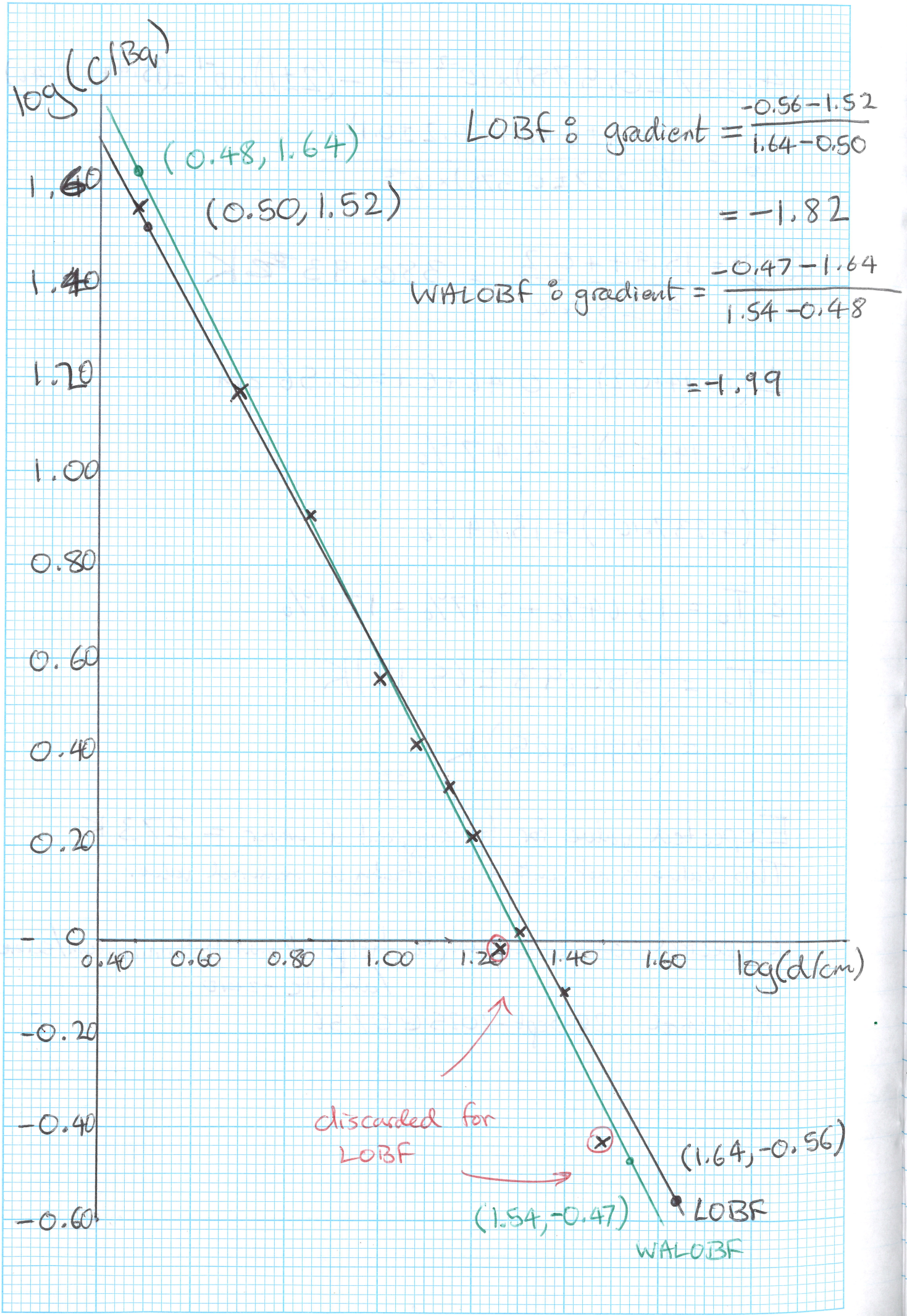
log C: y-axis; log k: y-intercept; n: gradient; log d: x-axis

We expect gradient of log C vs log d graph to be −2

Measured $n = -1.82 \pm 0.17$

So ~~upper~~ lower bound $n = -1.99$

close to $n = -2$, but not close enough.


log(C/Bq)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0
-0.20
-0.40
-0.60
0.40
0.60
0.80
1.00
1.20
1.40
1.60
log(d/cm)
(0.48, 1.64)
(0.50, 1.52)
LOBF: gradient = (-0.56 - 1.52)/(1.64 - 0.50)
= -1.82
WALOBF: gradient = (-0.47 - 1.64)/(1.54 - 0.48)
= -1.99
discarded for LOBF
(1.64, -0.56)
LOBF
(1.54, -0.47)
WALOBF