Part 1 - Magnetic Field around a straight wire

procedure and goal

We set up a power source, ammeter, and straight wire in series. We had a probe which could measure the magnetic field at any point in space.We completed two different experiments. In the first experiment we measured the magnetic field around the straight wire with a fixed distance but varying current. In the second experiment we measured the magnetic field around the straight wire with a fixed current but varying distance.

results

Table 1: With a fixed distance

I(amperes)	B(Gauss)
0.00	.041
1.00	.168
1.23	.217
1.51	.254
2.03	.320
2.23	.336
2.60	.369

Table 2: With fixed current

N(turns)	B(Gauss)	1/B(Gauss)
0	.318	3.144
2	.296	3.37
4	.283	3.53
6	.244	4.09
8	.223	4.48
10	.211	4.73
12	.188	5.31

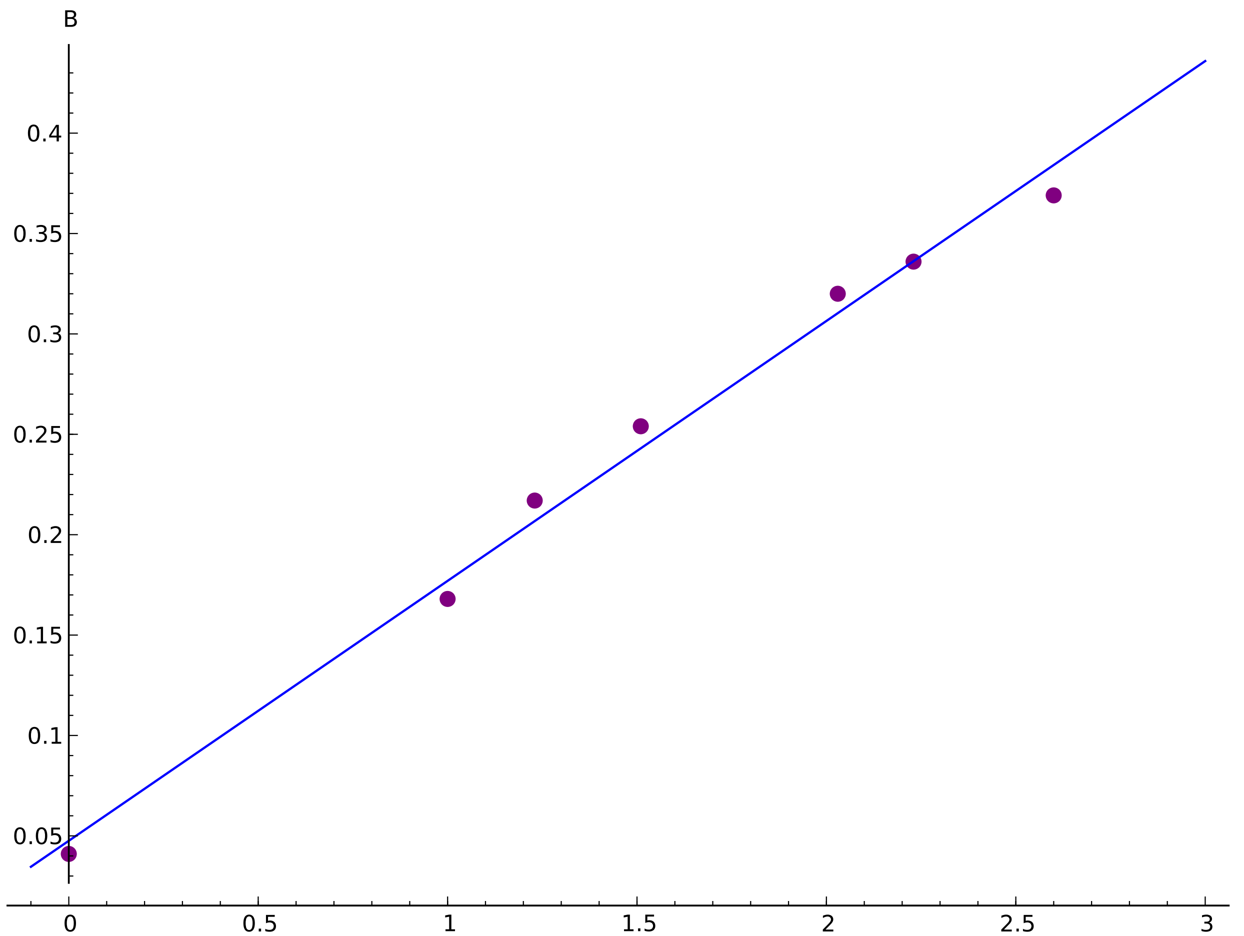

table 1 data: I vs B. Best fit line is $B = .129I + .047$

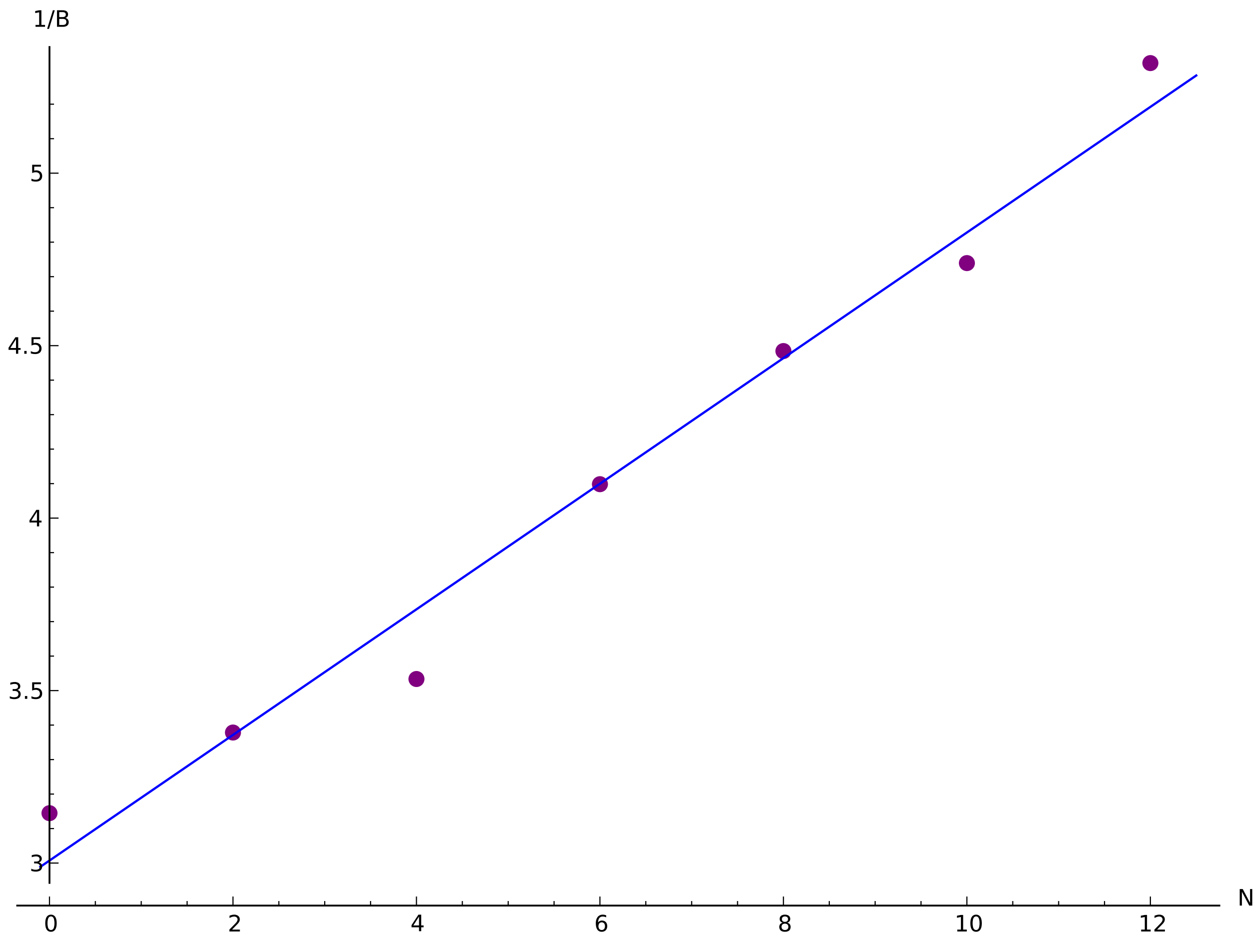

table 2 data: N vs $\frac{1}{B}$. Best fit Line is $\frac{1}{B} = .18N + 3$

analysis

In graph 1, we noticed that there is a linear relationship between the magnetic field and the current. The equation we calculated was $B = .129I + .047$ showed that the magnetic field increased as the current increased, but the distance stayed constant.In graph 2, based on another equation we calculated $1/B = .18N + 3$ we saw that the magnetic field was inversely proportional to the distance. Also the number of turns is proportional to the distance.

part 2 - Magnetic Field around Magnet

procedure and goal

results

Table 3

D(cm)	B(Gauss)	1/B(Gauss)
2.5	1.41	.709
3.5	1.21	.826
4.5	.914	1.09
5.5	.274	3.64
6.5	.07	14.28

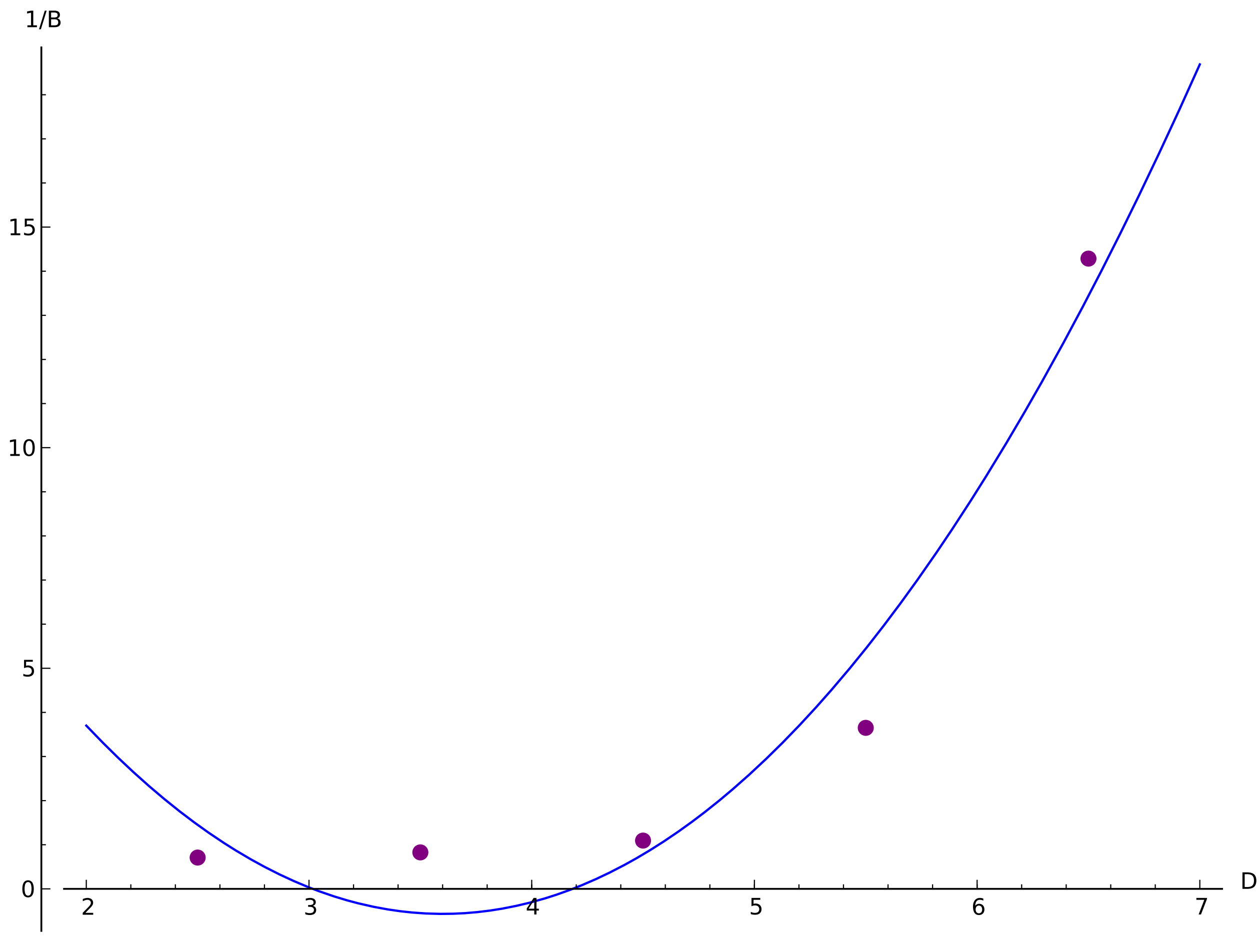

table 3 data: D vs $\frac{1}{B}$. Best fit quadratic was $\frac{1}{B} = 1.66D^2 - 11.99D + 21.03$

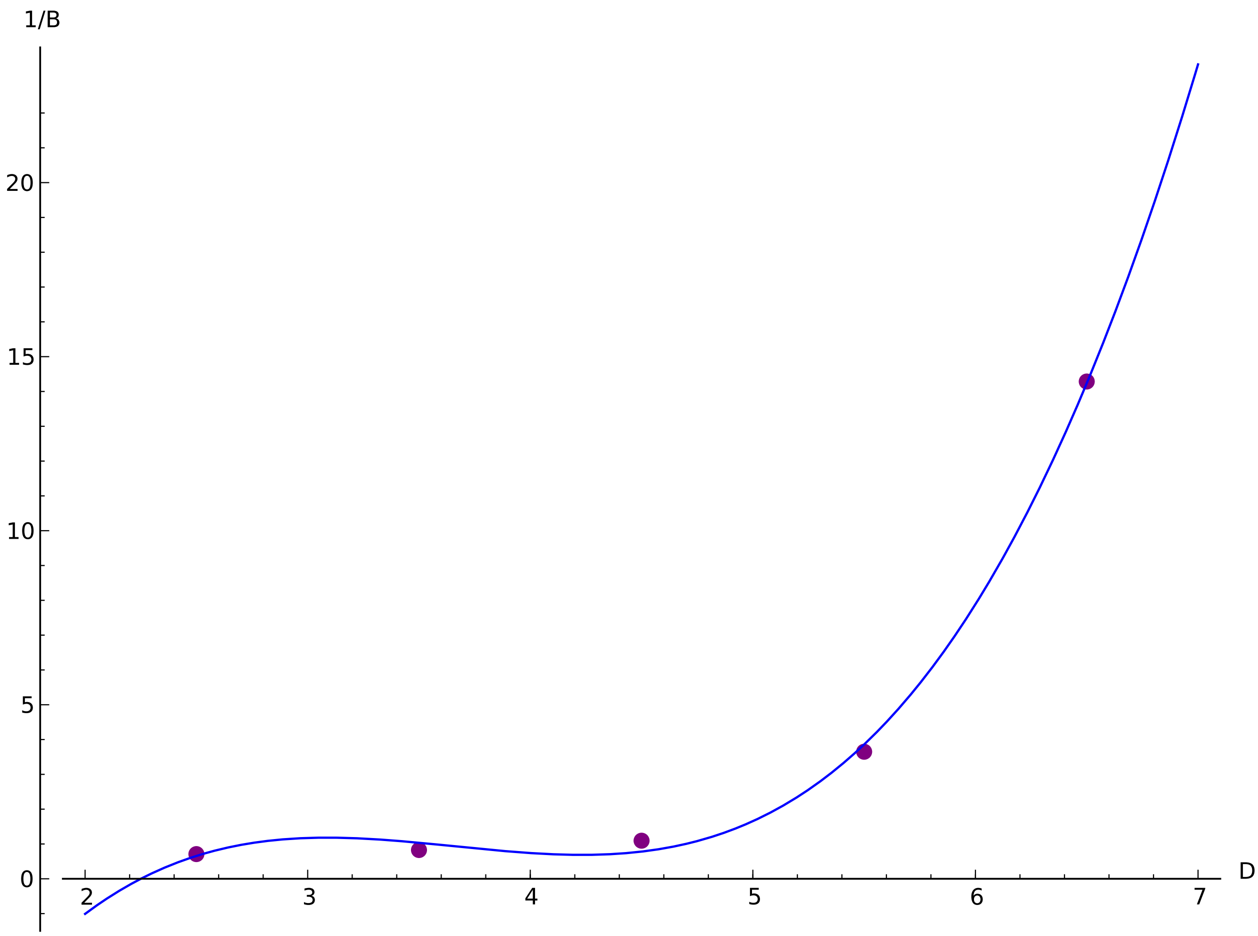

table 4 data: D vs $\frac{1}{B}$. Best fit cubic was $\frac{1}{B} = .066D^3 - 7.25D^2 + 25.9D - 29.07$

analysis