Part I: Logistic Regression

1. **What is the expected profit from each offer if you apply the break-even rule for each product mailing?**

Bought 'The Art History of Florence'

Case Summaries

mail_art

bought 'The Art History of Florence'	N	Sum
no	45478	12283.00
yes	4522	3327.00
Total	50000	15610.00

Gross Sale = 3327* $(18-9-3) = $19,962
Cost of Offer = 4522* $0.5 = $2,261
Profit Per Offer = Gross Sale - Cost of Offer = $19,962 - $2,261 = $17,701

Bought 'Painting Like a Pro'

Case Summaries

mail_diy

bought 'Painting Like a Pro'	N	Sum
no	43500	13436.00
yes	6500	5758.00
Total	50000	19194.00

Gross Sale = 5758* $(18-9-3) = $34,548
Cost of Offer = 6500* $0.5 = $3,250
Profit Per Offer = Gross Sale - Cost of Offer = $34,548- $3,250 = $31,298

Bought 'Vegetarian Cooking for Everyone'

Case Summaries

mail_cok

bought 'Vegetarian Cooking for Everyone'	N	Sum
no	44500	9178.00
yes	5500	4596.00
Total	50000	13774.00

Gross Sale = 4596* $(18-9-3) = $2,7576
Cost of Offer = 5500* $0.5 = $2,750
Profit Per Offer = Gross Sale - Cost of Offer = $2,7576-$2,750 = $24,826

2. **How many of the 500,000 consumers should be mailed one offer? two offers? three offers?**

#Offer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	18199	36.4	36.4	36.4
	1.00	16927	33.9	33.9	70.3
	2.00	12971	25.9	25.9	96.2
	3.00	1903	3.8	3.8	100.0
	Total	50000	100.0	100.0	

One offer: 16927, **Two offers:** 12971, **Three offers:** 1903.

3. How much overlap is there in customer interests? What explains this overlap? Provide evidence from the odds ratios in the three logistic regressions.

Part II: Marketing With a Limited Budget

1. **For each offer, what is the average predicted purchase probability for the "best" quintile, i.e. the best 10,000 consumers?**

Art

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Predicted probability	10000	.12695	.98416	.2747232	.16286725
Valid N (listwise)	10000				

Average predicted purchase probability of Art book is 0.27.

DIY

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Predicted probability	10000	.20373	.99927	.4485134	.21272425
Valid N (listwise)	10000				

Average predicted purchase probability of DIY book is 0.45.

COOK

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Predicted probability	10000	.12341	.99933	.4127322	.25954972
Valid N (listwise)	10000				

Average predicted purchase probability of cookbook is 0.41.

2. **Which product do you pick and how profitable do you expect the offer to be? How much more profitable is offering this product compared to either of the other two products?**
DIY has the highest probability.

ART

Case Summaries

bought 'The Art History of Florence'

Nprob_ar = 1 (FILTER)	N	Sum	Mean
Selected	10000	2771	.28
Total	10000	2771	.28

(2771*$6 - 10000*$0.5) * 10 = $116,260

DIY

Case Summaries

bought 'Painting Like a Pro'

Nprob_di = 1 (FILTER)	N	Sum	Mean
Selected	10000	4479	.45
Total	10000	4479	.45

(4479*$6 - 10000*$0.5) * 10 = $218,740

COOK

Case Summaries

bought 'Vegetarian Cooking for Everyone'

Nprob_co = 1 (FILTER)	N	Sum	Mean
Selected	10000	4148	.41
Total	10000	4148	.41

(4148*$6 - 10000*$0.5) * 10 = $198,880

Part III: Next Product To Buy Model

1. **What is the average predicted purchase probability for the "best" quintile? Compare this number to results in II.1 (part II, question 1). Does this make sense, and if so why?**

Case Summaries

max_prob

Percentile Group of max_prob	N	Sum	Mean
1	10000	6413.59	.6414
Total	10000	6413.59	.6414

Average predicted purchase probability: 0.64.

2/3. Calculate how many of the best 100,000 consumers should receive the art, the do-ityourself, and the cooking book offer, respectively. Calculate the expected profits from sending each of the 100,000 customers the offer that is best for them.

Case Summaries

Sum

bestprod	bought 'The Art History of Florence'	bought 'Painting Like a Pro'	bought 'Vegetarian Cooking for Everyone'
1.00	688	336	107
2.00	882	2833	198
3.00	287	168	2719
Total	1857	3337	3024

Expected profit = ((688+2833+2719)*$6 – 10000*$0.5)*10= $324,400
The most profitable offer in previous plan is DIY book, with a profit of $218,740.
Based on the NPTB model, the gross profit increased $105,660.
Bonus: $105660 *20% = $21,132