BikeRite Kickstarter Campaign

Background

Kickstarter (http://www.kickstarter.com/) is a popular crowdfunding site that was launched in 2009. Kickstarter was originally conceived to help artists raise funds to finance creative projects (e.g., films, works of art, performances). Many of the projects on Kickstarter still relate to the arts, but others are projects to raise money for new products or for new service businesses.

When an entrepreneur or artist starts a Kickstarter campaign, he or she sets the fundraising goal, the funding period (defined by a start date and an end date), and the awards set for different levels of funding pledges. For example, someone who is running a Kickstarter campaign to fund the production of a documentary might offer "a thank you in the credits" to anyone who pledges $20 or more. To see some examples of award levels, go to the Kickstarter site and look at some examples of projects.

Sarah and Matt are two friends who have been working on an idea for a uniquely designed bicycle accessory used to mount a cell phone on the handlebars, BikeRite[1].

They have decided to run a Kickstarter campaign to raise the money they need for initial production, distribution, and marketing. They need to discuss two of their decisions: what should their Kickstarter fundraising goal be, and what award levels should they offer?

They don't want to set the fundraising goal too high. If they don't meet it, then they wouldn't collect any of the money pledged. They also don't want to set it too low and miss out on some money.

[1] BikeRite is a fictitious but realistic project, based on similar Kickstarter projects.

Part 1: Project Data

To help inform their decision about the fundraising goal, they found a blog that had collected and posted several years' worth of data on Kickstarter projects (over 30,000 of them). That data is available to you in the workbook for this exercise.

Each row in the data set is a project. For each project, there are many details, including "goal" (the fundraising goal) and "pledged" (the amount they raised). Projects are also organized into a "category" (e.g., Narrative Film) and a "parent_category" (e.g., Film & Video).

1) How many projects are in the data set?

2) How many of them reached their funding goal (i.e., had pledges that reached or exceeded the goal)? What percentage of all the projects reached their funding goal?

3) There are four years in the data: 2009, 2010, 2011, and 2012. What percentage of projects in the data set reached their funding goal each year? (Use the **ending date** to determine the year of the project.)

Year (of End Date)	% of Projects that Reached Funding Goal
2009	100.00%
2010	99.95%
2011	
2012	

4) Is the average of the four percentages in the table above equal to the percentage from Question 2 (the percentage of all projects that reached their funding goal)? Why or why not?

5) What percentage of all Product Design projects reached their funding goal?

6)

a. In the data set, how many projects had a goal of $50,000 or lower?

b. What percentage of the projects with goals of $50,000 or lower reached their funding goal?

c. Fill in the missing cells in the following table, using **all the projects** in the database.

Projects that don't meet their goal collect no funds. Projects that do meet their goal collect the pledged amount. Calculate Average Funds Collected as the average amount of money collected per project, *including* projects that collect nothing because they did not meet their goal.

Goal Level	Number	% Reached Funding Goal	Average Funds Collected
$0-$10,000	30,476	83.93%	3,895.13
$10,000.01 - $20,000			
$20,000.01 - $30,000			24,367.91
$30,000.01 - $40,000	394		
$40,000.01 - $50,000		36.77%	

d. Fill in the missing cells in the following table, using just the projects in the **Product Design** category.

Goal Level	Number	% Reached Funding Goal	Average Funds Collected
$0-$10,000	425	80.00%	19,372.05
$10,000.01 - $20,000			40,242.48
$20,000.01 - $30,000	62	61.29%	
$30,000.01 - $40,000	20		
$40,000.01 - $50,000		38.24%	54,802.23

e. From this data, can you conclude that projects with higher goals (up to $50K) tend to collect more money?

Part 2: Setting Levels

Setting the award levels is an important part of a Kickstarter campaign. Backers (people who pledge to support the campaign) choose a level at which to contribute, and the project owners provide an award at each level. For new products, some of the award levels usually involve pre-sales of the product.

For example, here were the levels for a bicycle bell project that was funded on Kickstarter (https://www.kickstarter.com/projects/139160027/a-better-bicycle-bell-made-in-the-usa):

- Pledge $1: "Thanks!"
- Pledge $35 or more: the bell in the raw metal color
- Pledge $45 or more: the bell in black
- Pledge $55 or more: a polished metal bell
- Pledge $80 or more: two bells, one raw and one black

Sarah and Matt collected data on comparable Kickstarter projects: all the comparable projects were for bicycle accessories. The data on those projects is on the tab called List of Comparables. The bicycle bell project is project #12 on that list. The worksheet has columns for up to ten pledge levels, and for each of the pledge levels used in the project, there is a column showing the number of backers at that level.

1) Looking at the data for the bicycle bell project on the List of Comparables tab, find the percentage of backers that pledged at each of the five levels. Fill in the missing cells in the following table.

Pledge Level	Number of Backers	% of Total Backers for the Project
$1	86	1.48%
$35	2151	
$45		
$55		
$80		29.82%

Sarah and Matt decide that they are going to use the same pledge levels with similar awards for their campaign.

2) If Sarah and Matt can attract 500 backers in total, and the *backers pledge in the same proportions as they did for the bicycle bell project*, how much money could Sarah and Matt raise? For this question, assume that if someone pledges at a level (say $45), they contribute exactly at that level, not more. Also, in using the proportions, *don't* round the number of backers at each level to whole numbers.

3) If Sarah and Matt can attract 1,000 backers in total, and the backers pledge in the same proportions as they did for the bicycle bell project, how much money could Sarah and Matt raise? Again assume that if someone pledges at a level (say $45), they contribute exactly at that level, not more. And again, don't round the number of backers at each level.

4) Create a graph in Excel of the estimated money pledged as a function of the number of backers. Use a range of 0 to 2,000 backers in your graph.

    a. Does your graph show a straight line?

    b. If so, what is the slope of the line? What is the meaning of that slope? If not, how can you explain the shape of the graph?

5) Write the equation, by hand, for the function shown in your graph in Question 4.

6) If the fundraising goal is set at $20,000, how many backers would Sarah and Matt need to meet that goal? Get your answer three ways and confirm that they are all the same:
    a. Solve the written equation to find an exact answer.

    b. Use the graph you created above to estimate the answer.

    c. Numerically check your answer in your spreadsheet to see if the number of backers you found does, in fact, yield $20,000.

7) If the fundraising goal is set at $25,000, how many backers would they need?

8) Looking at the data for the bicycle bell project (on the List of Comparables tab), we see that the reported amount pledged (in the column labeled Pledged) was $331,938.
    a. If backers at *each level* in that project simply pledged the minimum for that level and no more, how much would they have raised? (To further clarify: assume the 2,151 backers who pledged at the $35 level each pledged *exactly* $35.)

    a. In aggregate, by what percentage did the bicycle bell backers pledge more than the minimum at each level? That is, if the pledge level was $15 and backers were pledging $18, they would be pledging 30% more than the minimum at that level. You don't have the individual pledges, but you have the total pledged (in the Pledged column) as well as the number of backers at each level. You can calculate the aggregate percentage above the minimum from that data.

    b. Sarah and Matt consider the possibility that backers will pledge above the minimum for each level in their project too. If backers pledge above the minimum at each level at the same aggregate percentage as the bicycle bell project, then how many backers would they need to meet a $20,000 fundraising goal?

Part 3: Capital Expenditure

If Sarah and Matt raise enough money, they can afford to invest in production equipment that would save them money over the lifetime of their business, assuming they realized at least moderate success.

They face a trade-off in production costs: they can invest more upfront for a lower per-unit cost, or less upfront for a higher per-unit cost. In particular, they can purchase a custom mold that will allow production via a more automated, injection-molding production process. The custom mold costs $15,000 and lasts a long time. Once that mold is created, the per-unit cost of producing each one is 50 cents. Or, if they don't create the mold, they need to buy other equipment for $500, and the more labor-intensive process costs $5 per unit.

If they only end up making a small number of units, buying the custom mold would not be worth it. For example, for 100 units, with the custom mold, they would spend $15,000 + 100 * ($0.50) = $15,050. But with the other approach, they would spend only $500 + 100 * ($5) = $1,000.

1) What is the breakeven number of units at which the custom mold is the better choice? That is, how many units would they have to produce to make the custom mold a lower cost option? Write the equation on paper, and solve it.

2) Create a graph in Excel that shows the total cost under each of the two production processes (custom mold vs. more labor-intensive) as a function of the number of units produced. For number of units produced, use a range of 0 to 6,000. Label your graph to show the answer you got for Question 1.

3) Confirm the solution to your equation in Question 1 works in your spreadsheet.

4) Using the award scheme from Part 2 and the proportions of backers at each level from the bicycle bell project (*and* once again assuming that backers pledge the minimum at each pledge level), answer the following question. How many backers do they need to cover the upfront cost (the $15,000) for the custom mold?

Part 4: Pricing

If Sarah and Matt are able to raise the money and get their product produced, they are thinking that they will charge $30-$70 for it, which is a middle-of-the-pack price for their product category. It won't be the cheapest, and it won't be the most expensive. They think people will want to buy it because of the unique design.

They did a little market research on the pricing using a survey. The survey showed people a description of the product and a price and asked, "How likely would you be to purchase this new product at this price?" The survey respondents were people who regularly ride their bicycles. They tested five price points (each survey respondent saw only one price point). Below (and in tab called Pricing Research), you see a summary of the relevant responses.

Price Point	Percent of people surveyed who said they would "probably" or "definitely" buy
$30	16.25%
$40	12.00%
$50	8.75%
$60	3.00%
$70	3.05%

1) Assume the product was available in stores and 100,000 regular bike riders were aware of it. Using the percentages in the chart above as purchase percentages, create a graph that shows the amount of revenue at each of the price points considered.

2) If 200,000, instead of 100,000, regular bike riders were aware of the product, does that change the revenue-maximizing price? If so, how? If not, why not?

3) If Sarah and Matt went with the custom-mold production process (as described in Part 3), then of the price points considered, which one maximizes **profit**? (Profit is revenue minus cost.)

4) If Sarah and Matt went with the labor-intensive production process (as described in Part 3), then of the price points considered, which one maximizes **profit**?

Part 5: Larger Pledges

In the bicycle bell project that Sarah and Matt used as a model, the highest pledge level was only $80. But some of the other comparable projects had pledge levels much higher than that.

1) Looking at the List of Comparables tab, what was the highest pledge level offered out of the projects listed? How many people pledged at that level?

2) How many of the 12 comparable projects offered pledge levels at $100 or higher? Considering all the backers of all 12 projects, what percent of them pledged at $100 or higher?

3) How many of the 12 comparable projects offered pledge levels at $1000 or higher? Considering all the backers of all 12 projects, what percent of them pledged at $1000 or higher?

4) Sarah and Matt are considering offering a higher pledge level in addition to the five lower pledge levels from the bicycle bell project. They are considering a $250 pledge level.
    a. They estimate the probability of getting *at least* one pledge at this level with the (percentage) answer to Question 2 above. They think they could get *up to* three pledges at $250. They think they are twice as likely to have a single pledge at $250 as they are to have exactly two pledges at $250. Further, they think they are as likely to have exactly two pledges at $250 as they are to have exactly three. Using that information,
        i. What is the probability that they have 0 pledges at $250?

        ii. What is the probability that they have exactly 1 pledge at $250?

        iii. What is the probability that they have exactly 2 pledges at $250?

        iv. What is the probability that they have exactly 3 pledges at $250?

    b. Assume that any pledges at the higher ($250) level are independent of what happens at the five lower levels. What is the "expected value" of pledges from the $250 level? *An "expected value" is a probability-weighted average of values. Assume that people that pledge at that level pledge exactly $250, not more.*

Part 6: Analyzing Base-Case, Pessimistic, and Optimistic Scenarios

In Part 2, Question 2, you computed an estimate of money pledged with 500 backers. Use that as a base-case scenario, or most likely scenario. Sarah and Matt are also considering a pessimistic scenario, with only 200 backers, and an optimistic scenario, with 1,200 backers. They assume that the proportions of people who would participate at the different pledge levels would stay the same across the base-case, pessimistic, and optimistic scenarios. (As before, *don't* round the number of backers at each level to whole numbers.)

For the questions below, use only the initial pledge levels ($1-$80), not the higher ($250) pledge level.

1) Pessimistic scenario.
    a. What is the estimate of money pledged under the pessimistic scenario?

    b. Would they be able to afford the custom-mold production process (see Part 3) in this scenario?

    c. Which price should they charge (see Part 4) in this scenario?

2) Optimistic scenario.
    a. What is the estimate of money pledged under the optimistic scenario?

    b. Would they be able to afford the custom-mold production process (see Part 3) in this scenario?

    c. Which price should they charge (see Part 4) in this scenario?

3) Sarah and Matt know that the three scenarios are just three cases of what could happen—of course there are many variations on the outcomes. But as an approximation to help them think through both possible outcomes and their likelihoods, they estimate probabilities for each of the three cases. They assign a 60% chance to the base scenario, a 20% chance each to the pessimistic and the optimistic scenarios.
    a. If the funding goal is set at $10,000, what is the expected value (using the scenario probabilities) of money they would raise?

    b. If the funding goal is set at $20,000, what is the expected value (using the scenario probabilities) of money they would raise?