1. You work at an e-commerce company that sells three goods: widgets, doodads, and fizzbangs. The head of advertising asks you which they should feature in their new advertising campaign. You have data on individual visitors' sessions ([**activity on a website**](https://en.wikipedia.org/wiki/Session_%28web_analytics%29), [**pageviews**](https://en.wikipedia.org/wiki/Page_view), and purchases), as well as whether or not those users [**converted**](https://en.wikipedia.org/wiki/Conversion_marketing) from an advertisement for that session. You also have the cost and price information for the goods.

Question: What good should be used in a new advertising campaign?

Goal: Advertising campaigns are used to promote either a new product or revitalize an old product.

Definitions: Old Product = low website activity, low pageviews, low purchases

Revitalize = increase purchases, increase ad conversion, increase pageviews

Low = below average or least of the products

Test: Which product has below average/least website activity, pageview, purchases?

|  | **Website Activity** | **Pageviews** | **Purchases** |
| --- | --- | --- | --- |
| Widgets | # | # | # |
| Doodads | # | # | # |
| Fizzbangs | # | # | # |

1. You work at a web design company that offers to build websites for clients. Signups have slowed, and you are tasked with finding out why. The [**onboarding funnel**](https://en.wikipedia.org/wiki/Funnel_analysis) has three steps: email and password signup, plan choice, and payment. On a user level you have information on what steps they have completed as well as timestamps for all of those events for the past 3 years. You also have information on [**marketing spend**](https://en.wikipedia.org/wiki/Marketing_spending) on a weekly level.

Question: Why are signups slowing down?

Goal: Increase signups by decreasing signup time

2nd Question: Which steps in the onboarding funnel is taking to long?

Definitions: long = greater than 1 minute

Test: Which onboarding stage is taking the longest?

|  | **Completion time < 1 min** | **Completion time > 1 min** |
| --- | --- | --- |
| Email & Password | # | # |
| Plan Choice | # | # |
| Payment | # | # |

1. You work at a hotel website and currently the website ranks search results by price. For simplicity's sake, let's say it's a website for one city with 100 hotels. You are tasked with proposing a better ranking system. You have session information, price information for the hotels, and whether each hotel is currently available.

Question: What is the best way to filter search results for hotels?

Goal: Applying a search result filter that gives better results.

Definitions: Better = less time searching, more reservations

Filters = price, availability

Test: Which filter provided the most reservations in the least amount of time?

|  | **# of reservations** | **Time Searching** |
| --- | --- | --- |
| By Price | # | 00:00 |
| By Availability | # | 00:00 |

1. You work at a social network, and the management is worried about [**churn**](https://en.wikipedia.org/wiki/Churn_rate) (users stopping using the product). You are tasked with finding out if their churn is atypical. You have three years of data for users with an entry for every time they've logged in, including the timestamp and length of session.

Question: Is churn atypical?

Goal: Finding out if the users of the social network are behaving abnormal.

Definitions: abnormal/atypical = difference in churn from 3 years ago.

churn = number of logins with the length of session; weekly

Test: Are users of the social network behaving differently now in terms of the number of log ins and the length of their sessions compared to 3 years ago?

|  | **# of Logins** | **Length of Session** | **Churn (Logins \* Session)** |
| --- | --- | --- | --- |
| Users from 3 year ago | # | 00:00 | 00:00 |
| Users from today | # | 00:00 | 00:00 |
| Difference | # - # | 00:00 - 00:00 | 00:00 - 00:00 |