



Estimation Questions

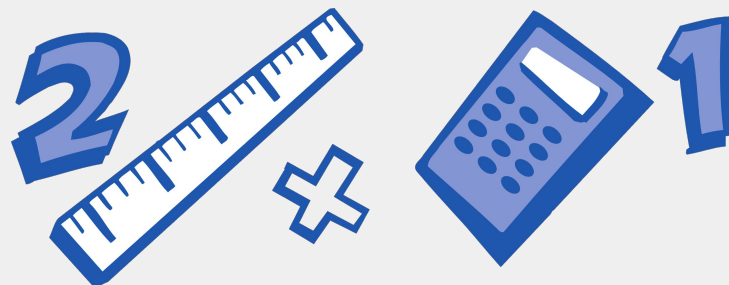


“The most important thing to remember about estimation questions is: employers aren’t looking for a ‘correct’ answer. They are looking for a few key qualities:

- Problem-solving skills
- Reasonable assumption-setting
- Communication skills” - Rethink Studying

Agenda

1. Definition
2. Approach
3. Example Estimation Question
4. In-Class Activity



1.

Definition

What even are Estimation Questions?

What are Estimation Questions?

Estimation questions are often hidden within other interview questions, but test your ability to break down problems in a **data-driven, logical manner**.

These questions are centered around **computing** a value using **pre-existing knowledge** and **applying intuition**. These questions will make a lot more sense as we introduce some examples!



Why do we get Asked Estimation Questions?

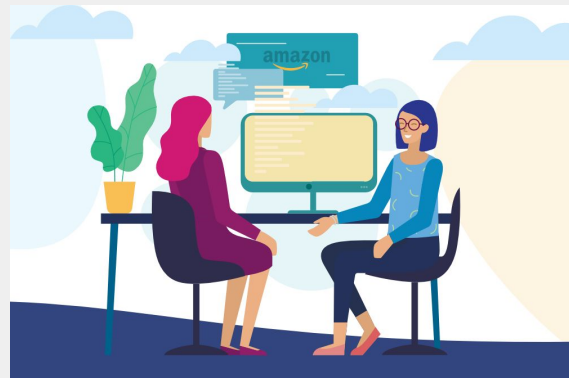
What your interviewer is looking for:

- Ability to break down a problem into logical components
- An ounce of intuition somewhere :')
- Ability to clearly explain your logic

Why is my interviewer looking for this?

As a PM, you'll often need to:

- Explain your thoughts in a clear and structured manner
- Evaluate and challenge assumptions
- Drive decision-making using data



2.

Approach

How-to-Approach Estimation Questions

Approaching an Estimation Problem

1. As always, ask your clarifying questions
2. Start with a formula
3. Break down each variable
4. Calculate the numbers
5. Conduct a sanity check



Numbers Cheat Sheet

Before we start, here's some useful basic information to memorize:

US Population	300 million
Avg. people per US household	3
World Population	7 billion
Area of US	3 million square miles
Life Expectancy in US	80 years
Life Expectancy in World	65-70 years

Back to the Basics - “Oh shoot, I can’t remember..”

TIP: Use the information you DO know to derive an estimate

Ex. If you can’t remember how many square miles the US encompasses, think about what info you do know.

How many miles is a plane ride from Maryland to California, what about from Chicago to Texas? How long does it take to drive to New York, what’s your average speed, and if you had to guess, how many times longer would a trip from Maine to Florida take?

Sometimes, if the information is something relatively well-known, you can go ahead and ask the interviewer - though then may turn the tables and ask “what do you think?”, which is your cue to compute the value yourself.

3.

Example Question

Runthrough of Sample Estimation Question

Sample Estimation Question

“

Interviewer: “How much money does the dog food industry make annually?”



Clarifying Questions - Narrow Down the Scope

- *Candidate:* Does “money” mean profit or revenue?
 - If it’s profit, what should I count as costs?
- *Interviewer:* Only focus on revenue.
- *Candidate:* When we say dog food, are we counting dog treats/chews/bones as well?
- *Interviewer:* No, don’t focus on dog treats/chews/bones.
- *Candidate:* Is this just for the U.S.?
- *Interviewer:* Yes, this is just for the U.S.

Clarifying Questions - Restate the Problem

- *Candidate:* “Ok, so we’re trying to figure out the annual **revenue** of the dog food industry in **just the U.S.** - we’re also only considering revenue generated from the typical **bags of dog food** you would find in a pet store. And we’ve decided that we’ll **exclude treats/chews/bones.**”



Formula Generation - What information Would You Want?

- **Candidate:** “In order to figure this out, there’s a bunch of information I’ll likely want:
 - The number of dogs in the U.S.
 - The average cost of a bag of dog food
 - The number of bags of dog food a single dog needs in a year”

Formula Generation - Setting Up Your Formula

- **Candidate:** “If I can get this information, then I can solve for the amount of revenue with the following equation:

[# dogs in US] X

[# bags of dog food per dog per year] X

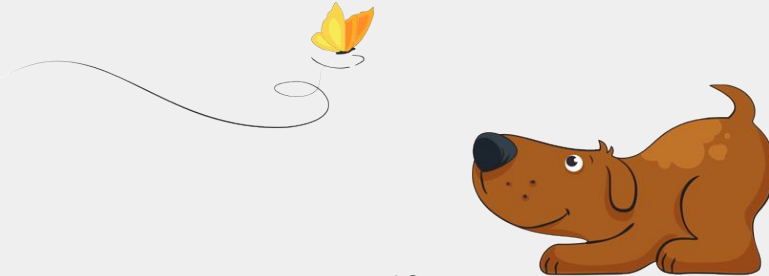
[cost per bag of dog food]”

Breaking it Down - [# of Dogs in US]

- *Candidate:* “Let me start with the number of dogs in the U.S.”
- *Candidate:* “If I take my own family/friends as a sample of the U.S. population, I would say roughly 30% of households own at least 1 dog. This could definitely be an over/underrepresentation, but I think this is a good proxy since I don’t have much other background knowledge on dog owners.”

Breaking it Down - [# of Dogs in US]

- **Candidate:** “Of these 30% of dog-owning households, I want to say that the majority of households have 1-2 dogs. From pure intuition, I want to say that half of these households (so 15% of all households) have 1 dog. And another 10% own 2 dogs, with the remaining 5% are owners of 3+ dogs.”



Breaking it Down - [# of Dogs in US]

- **Candidate:** Now let's compute:
 - Given that there are roughly 100 million households in the US:
 - **15 million** have 1 dog
 - **10 million** have 2 dogs
 - **5 million** have 3+ dogs (let's use 4 as the average of these 3+ dog owners)
 - Total # of dogs: $15 + 20 + 20 = 55$ million dogs.

Breaking it Down - [# of Bags of Dog Food per Dog per Year]

- **Candidate:** “From my memory of the last time I went to a pet store, I think dog food comes in pretty big bags, maybe like 20 lbs of food. I think that quantity could probably feed a dog for roughly a month, so let’s say that a single dog needs 12 bags of dog food per year.”

Breaking it Down - [Cost per Bag of Dog Food]

- *Candidate:* “Given that having a dog seems to be relatively affordable (since I proposed that 30% of households own dogs), I want to say that a single bag of dog food is definitely under \$100. Since I don’t really have too much previous knowledge on dog food, let’s just say that a bag of dog food is around \$30.”

Putting it All Together

55 million dogs in US **X**

12 bags of dog food per dog per year **X**

\$30 per bag of dog food =

\$19.8 billion



Week 8 HW due next Friday (8/30) before class:

- **Schedule mock interview with assigned peer and submit write-up on Elms!**
- **Complete the feedback survey posted on Slack and Elms to receive participation points!**

Class Activity:

**How many people use
the Twitter mobile
application in the
United States?**

