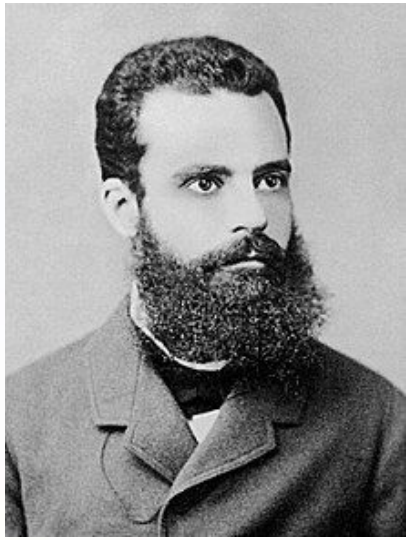
Using Data for Improvement
Pareto Graph Activity

Identifying Causes of Problems



Vilfredo Pareto

Pareto Principle

About 20% of the causes will create 80% of the impact

An Example of Visualizing the Pareto Principle

You want to improve your health by exercising more.

You start by investigating: What do I know about my exercise habits?

An Example of Visualizing the Pareto Principle

Why I did not go to the gym in the last two months…

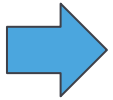
Reasons I Did Not Exercise
Unable to make time due to work
Son was sick
Forgot
Didn’t bring gym clothes to gym
Woke up late

STEP 1: Brainstorm general categories of causes (in this case: reasons for not exercising)

An Example of Visualizing the Pareto Principle

Reasons why I did not go to the gym in the last two months…

Reasons I Did Not Exercise	Number of Times
Unable to make time due to work	3
Son was sick	1
Forgot	12
Didn't bring gym clothes to gym	2
Woke up late	6



Reasons I Did Not Exercise	Number of Times
Forgot	12
Woke up late	6
Unable to make time due to work	3
Didn't bring gym clothes to gym	2
Son was sick	1

Reasons (causes) sorted in descending order

STEP 2: Review the data and tally the number of incidents for each category (cause). List the causes in order of frequency – from most to least frequent.

An Example of Visualizing the Pareto Principle

Reasons why I did not go to the gym in the last two months…

Reasons I did not Exercise	Number of Times
Unable to make time due to work	3
Son was sick	1
Forgot	12
Didn't bring gym clothes to gym	2
Woke up late	6

Total = 24

Reasons I did not Exercise	Number of Times	Cumulative Proportion
Forgot	12	50%
Woke up late	6	75%
Unable to make time due to work	3	88%
Didn't bring gym clothes to gym	2	92%
Son was sick	1	100%

Calculating cumulative proportion

12+6 = 18

18/24 = 75%

STEP 3: Calculate the cumulative proportion for each row (cause). For example, the cumulative proportion for the second row is the sum of the number of incidents for rows one and two divided by the total number of incidents.

An Example of Visualizing the Pareto Principle

Reasons why I did not go to the gym in the last two months…

Reasons I did not Exercise	Number of Times	Cumulative Proportion
Forgot	12	50%
Woke up late	6	75%
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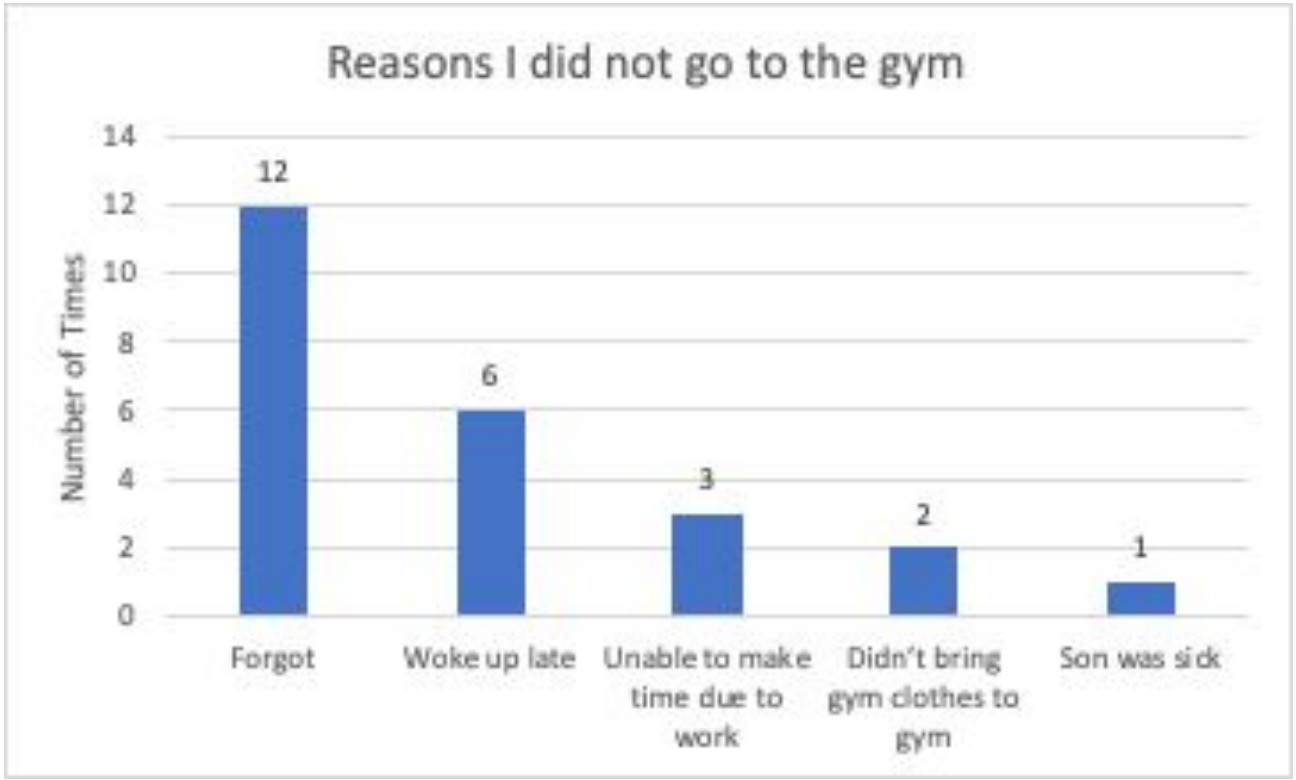
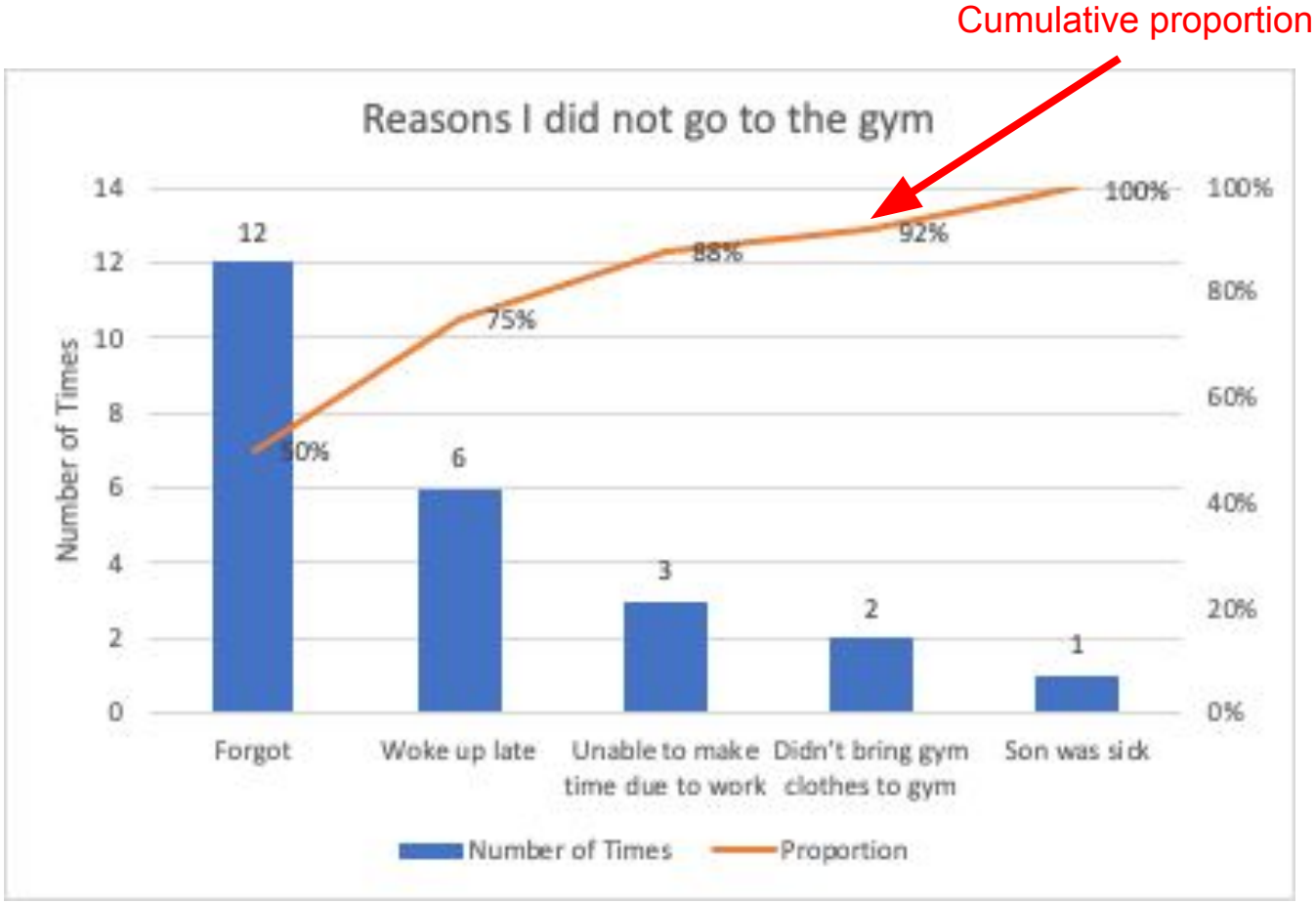


STEP 4: Chart your data. The frequency of causes is represented by an ordered bar chart with the categories (reasons) listed along the x-axis.

An Example of Visualizing the Pareto Principle

Reasons why I did not go to the gym in the last two months…

Reasons I did not Exercise	Number of Times	Proportion
Forgot	12	50%
Woke up late	6	75%
Unable to make time due to work	3	88%
Didn't bring gym clothes to gym	2	92%
Son was sick	1	100%



STEP 5: Include a line showing the cumulative percentage (axis on the right).

An Example of Visualizing the Pareto Principle

Reasons why I did not go to the gym in the last two months…

Reasons I did not Exercise	Number of Times	Proportion
Forgot	12	50%
Woke up late	6	75%
Unable to make time due to work	3	88%
Didn't bring gym clothes to gym	2	92%
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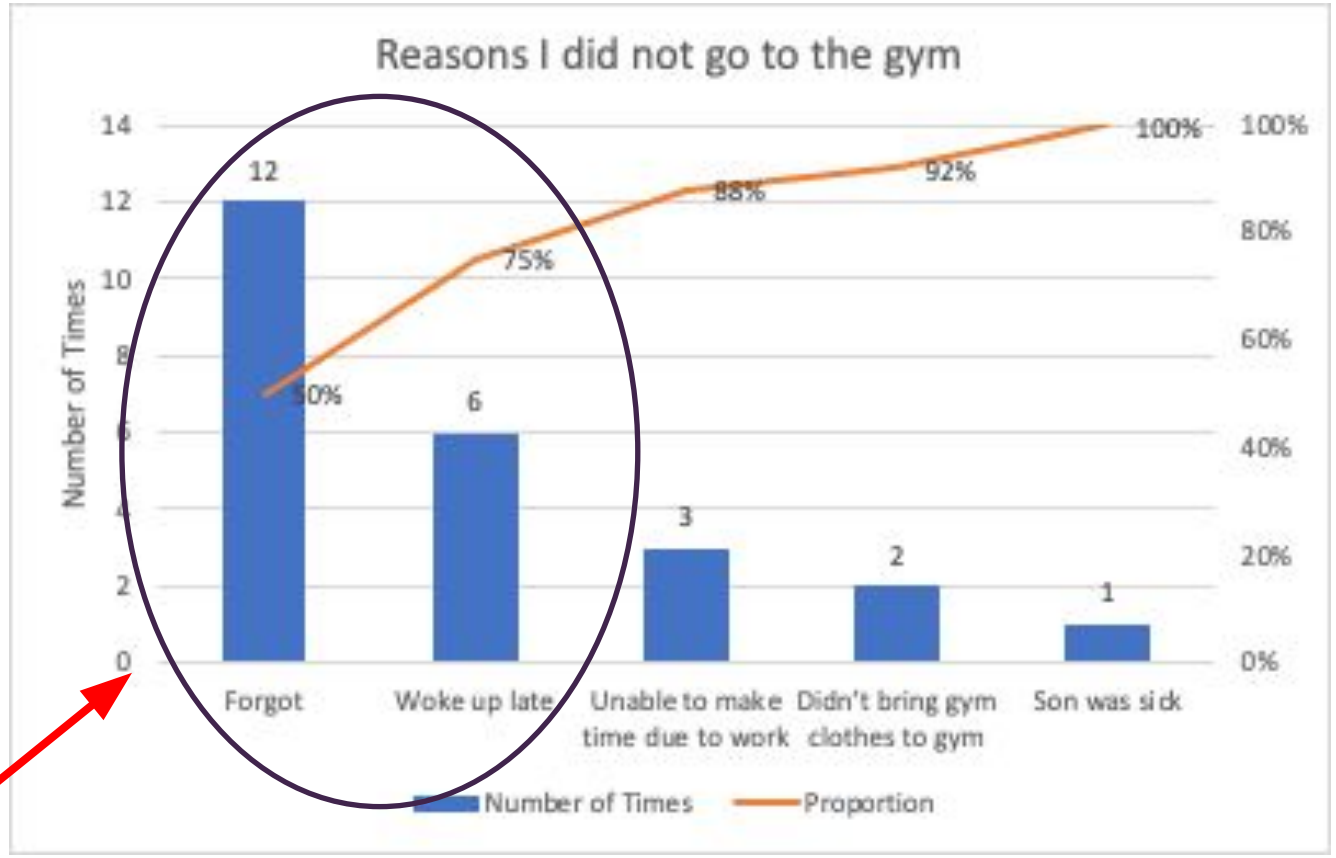

Forgetting and waking up late contributed to nearly 80% of the causes of not going to the gym. These might be key root causes to address.

Activity: Creating a Pareto Graph

Hands-On Activity: Creating a Pareto Graph

An improvement team at a community college wants to increase the number of students that pass college math so they can graduate.

They may want to investigate: What do we know about developmental math at our campus?

Example: Developmental Math Sequence at a Community College

Where do we lose students?

Fall 2009 cohort, 1 college

Level 1: Elementary Algebra

Level 2: Intermediate Algebra

College Math

742
Incoming students that place 2 levels below college level math

550 enroll → 447 pass

302 enroll → 224 pass

107 enroll → 79 Pass College Math!

First day at community college

2 years later

Activity: Creating a Pareto Graph

1. Identify LOSS POINTS in the developmental math sequence using the data provided
2. Create an ordered bar graph on the template
3. Add the proportion line to the graph

Remember: the purpose of doing this analysis is to help you identify where/how you should intervene in the system


Pareto Graph: Where do We Lose Students?
250
200
150
100
50
0
100%
80%
60%
40%
20%
0%
Number of Students
Cumulative Proportion
Reason Students were Lost
Reason Students were Lost
Reason Students were Lost
Reason Students were Lost
Reason Students were Lost
Reason Students were Lost
Fill in the Reasons Why Students DId not Continue

ANSWER KEY

Example: Developmental Math Sequence at a Community College

Where do we lose students?

Fall 2009 cohort, 1 college

Level 1: Elementary Algebra

Level 2: Intermediate Algebra

College Math

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Incoming students that place 2 levels below college level math

550 enroll → 447 pass

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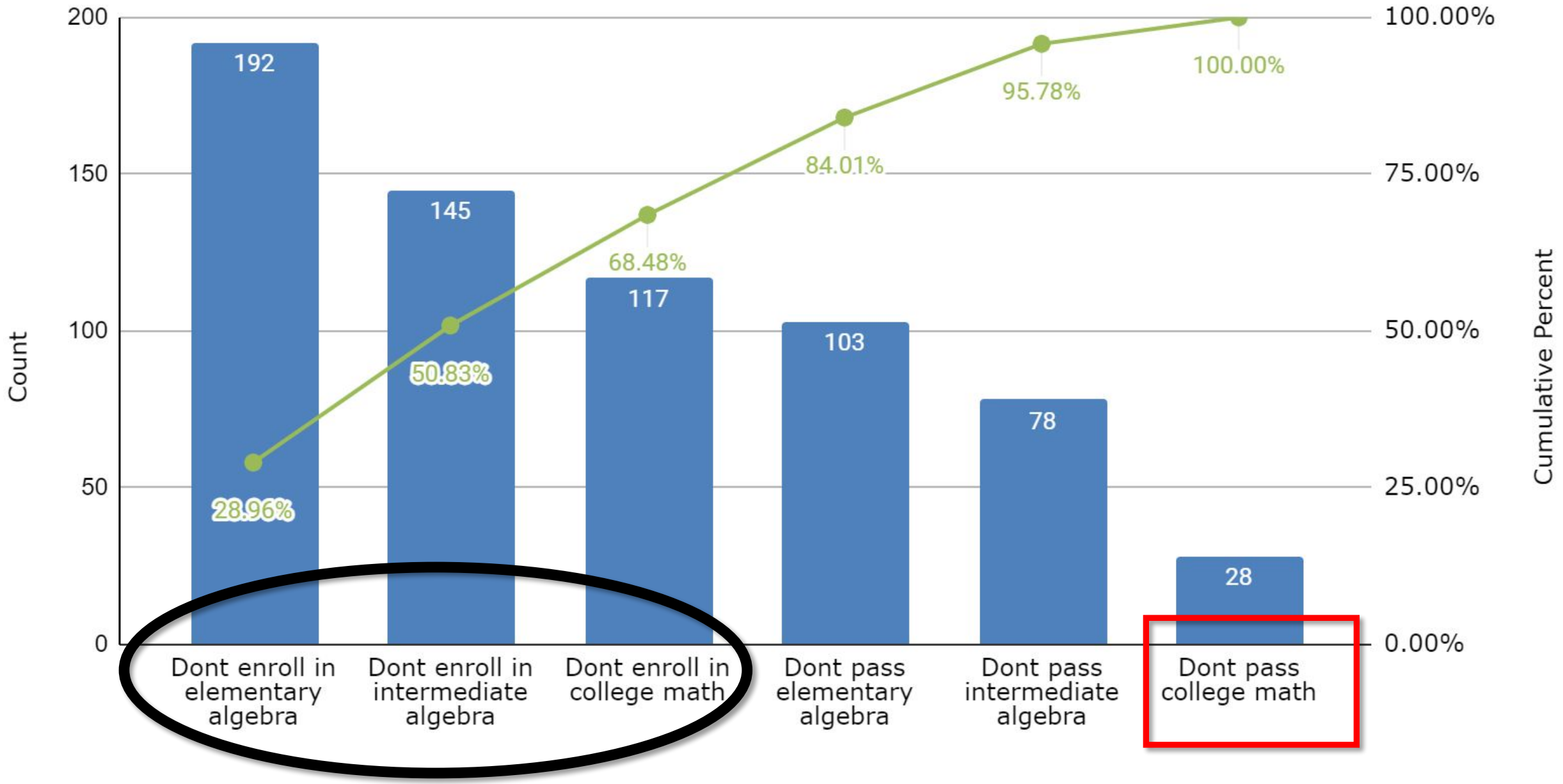
For example, 742-550 = 192 students who were lost because they didn't enroll in elementary algebra

ANSWER KEY

Reasons why students don't get college math credit



Questions?

Key Takeaways

Take Away #1

What data you need and how you use data differs across an improvement journey

What question are you asking?

Take Away #2

Taking the time to understand why we are getting current outcomes can help to strategically focus the improvement effort

Important to come to a collective understanding