Today's learning objective:

By the end of class, I will be able to create a cumulative frequency diagram, a box-and-whisker plot, and a stem-and-leaf plot.

Today's language objective:

I will use the following key terms when solving problems with peers:
*Cumulative frequency
*Minimum, maximum, Q1, Median, Q3
*Stem, leaf

Exploring the IB Exam Statistical Bulletin

Mathematics Grade Distribution

Subject	Candidates	Mean Grade	% 1	% 2	% 3	% 4	% 5	% 6	% 7
FURTH. MATHS HL	216	4.88	5.88	7.35	14.22	11.27	13.73	21.57	25.98
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We want to first create a histogram.

Histograms show frequencies of events.

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A frequency is how often something occurs.

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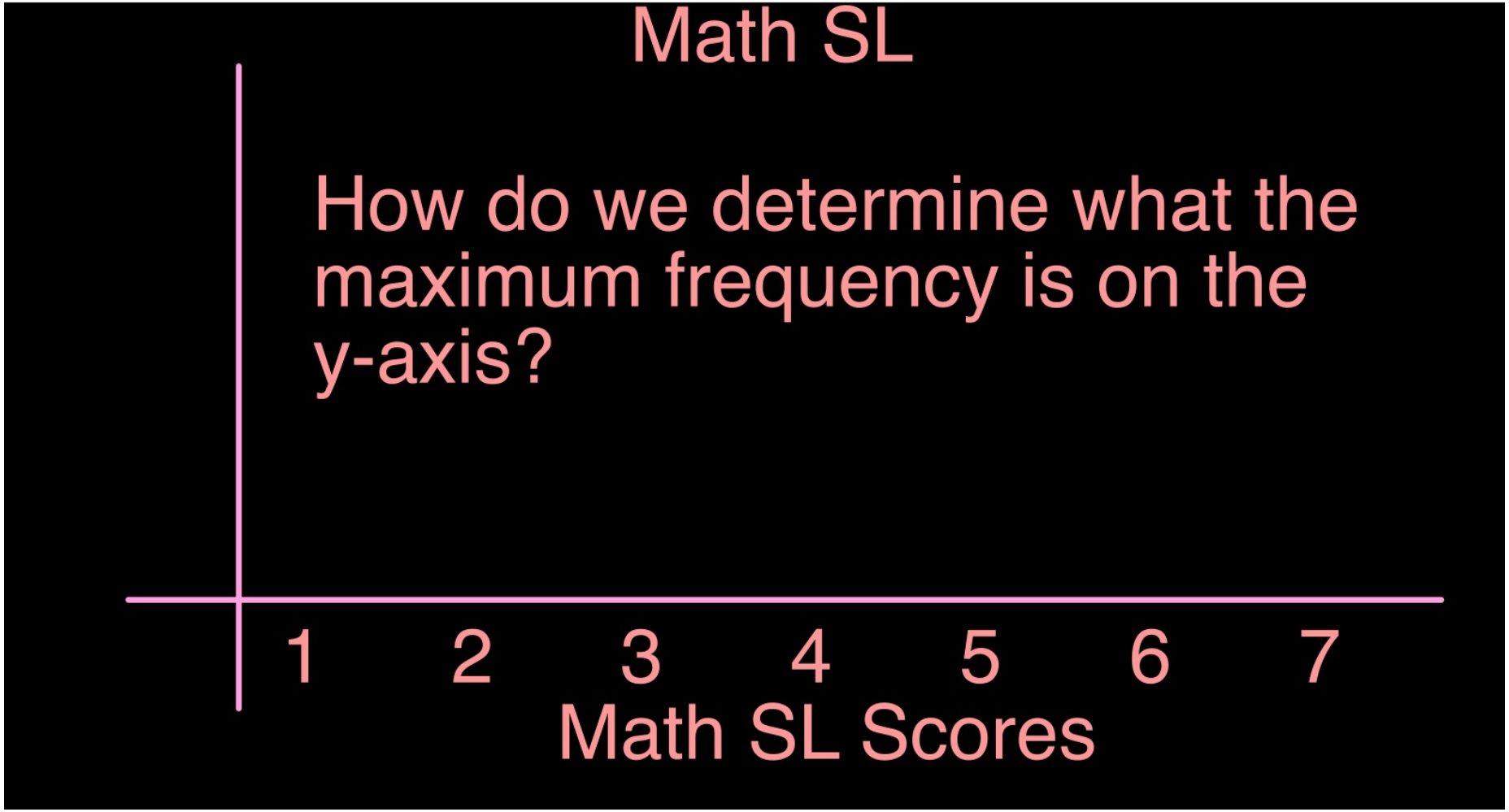

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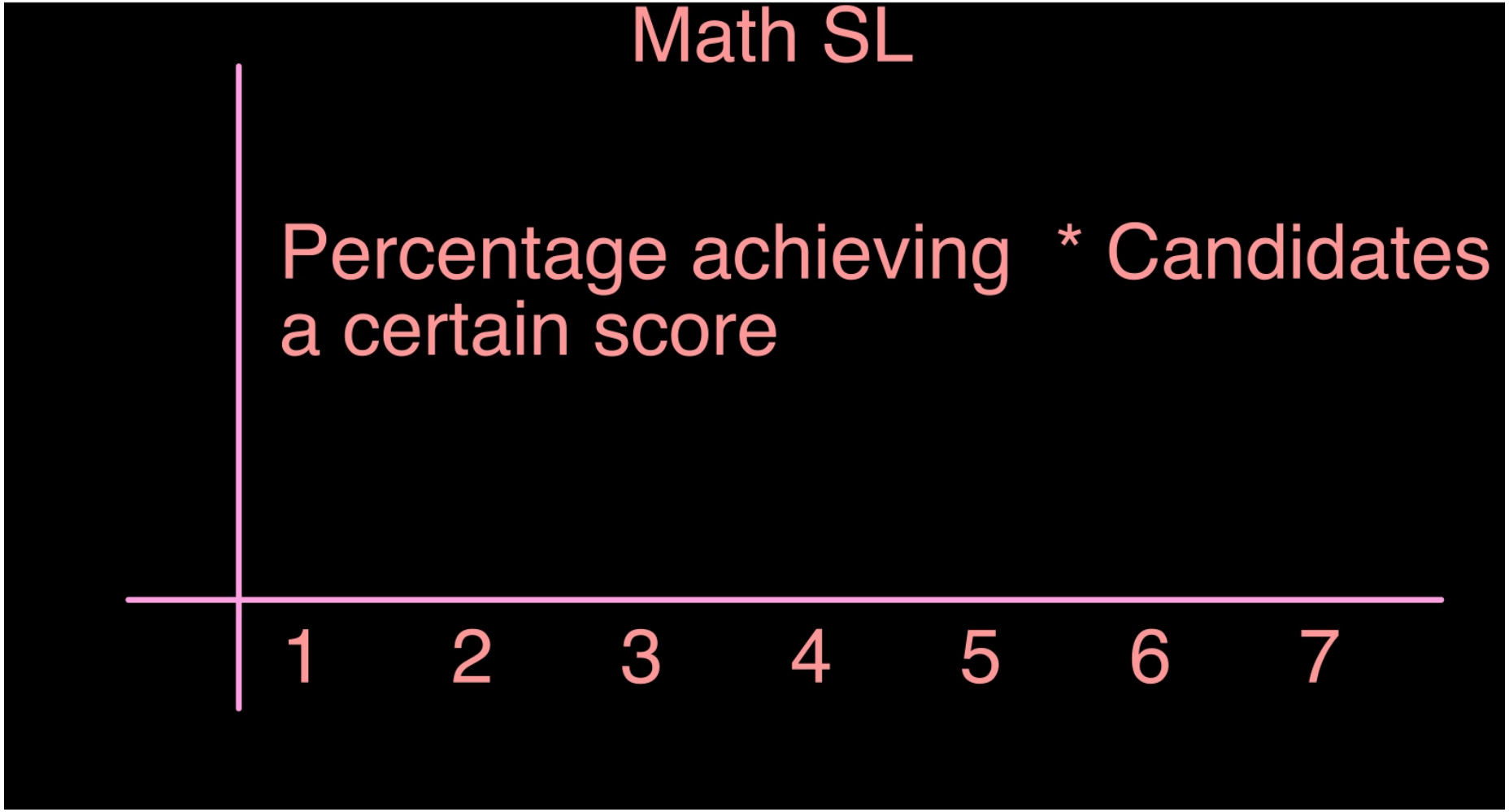

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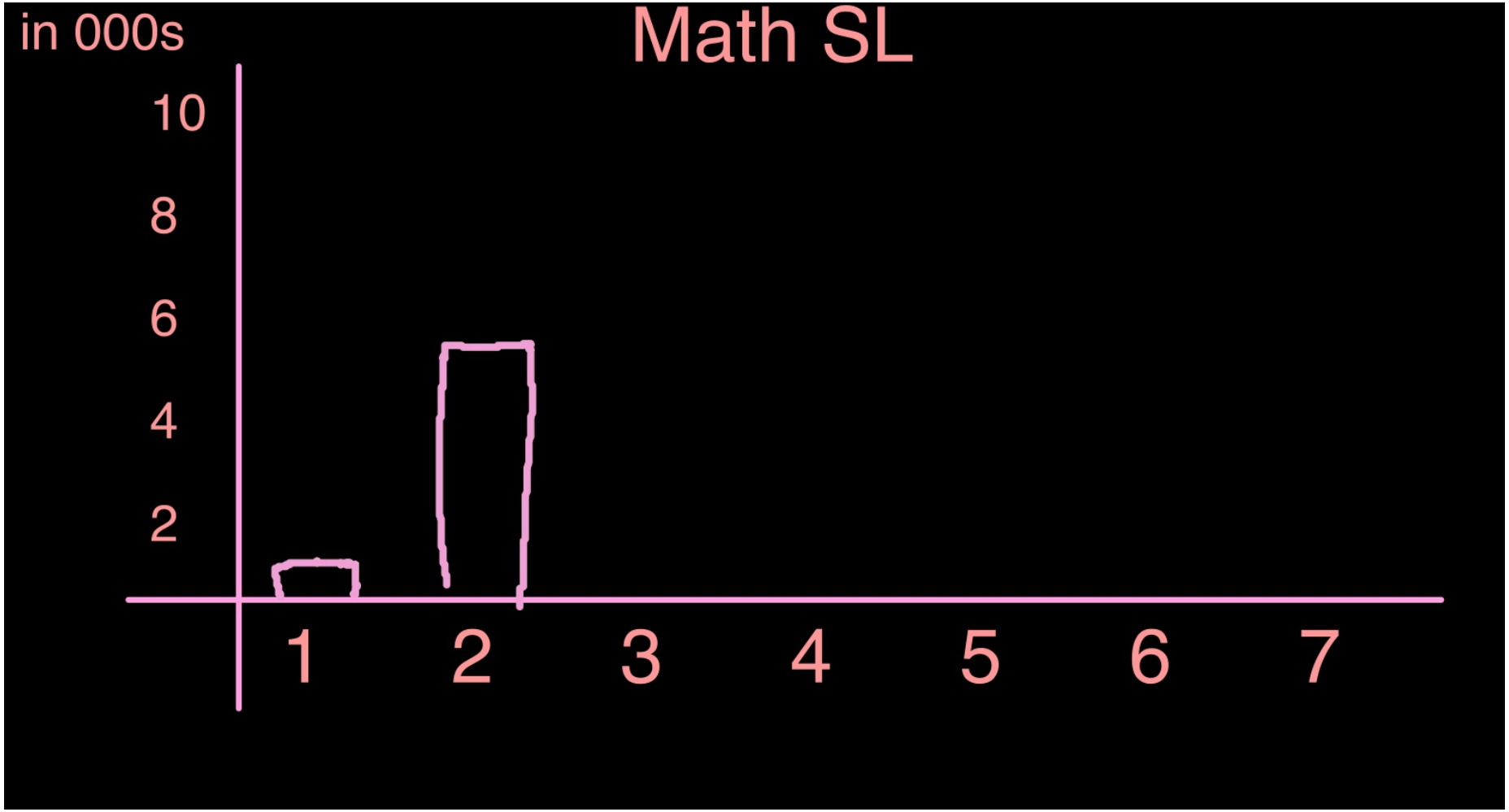

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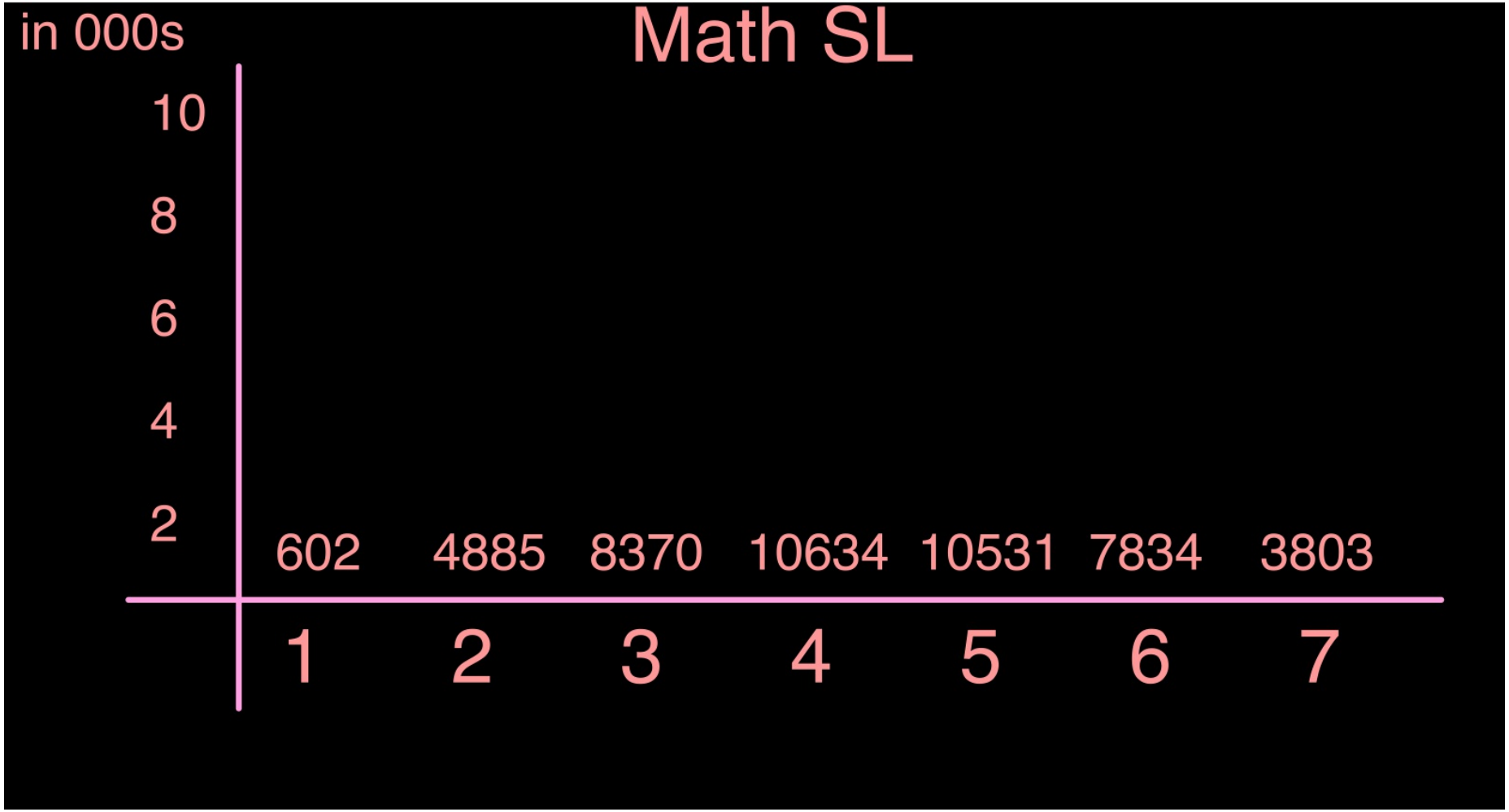

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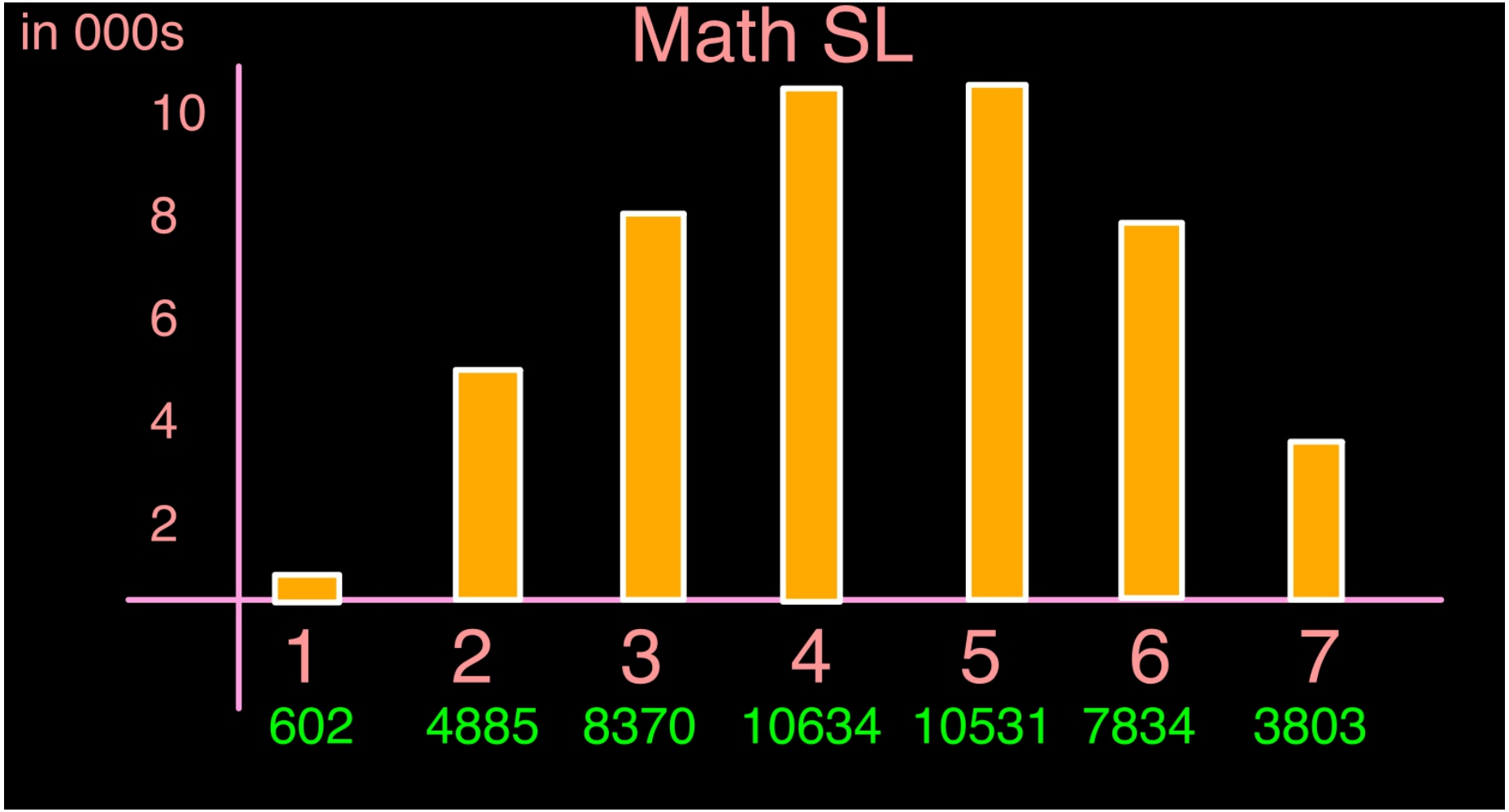

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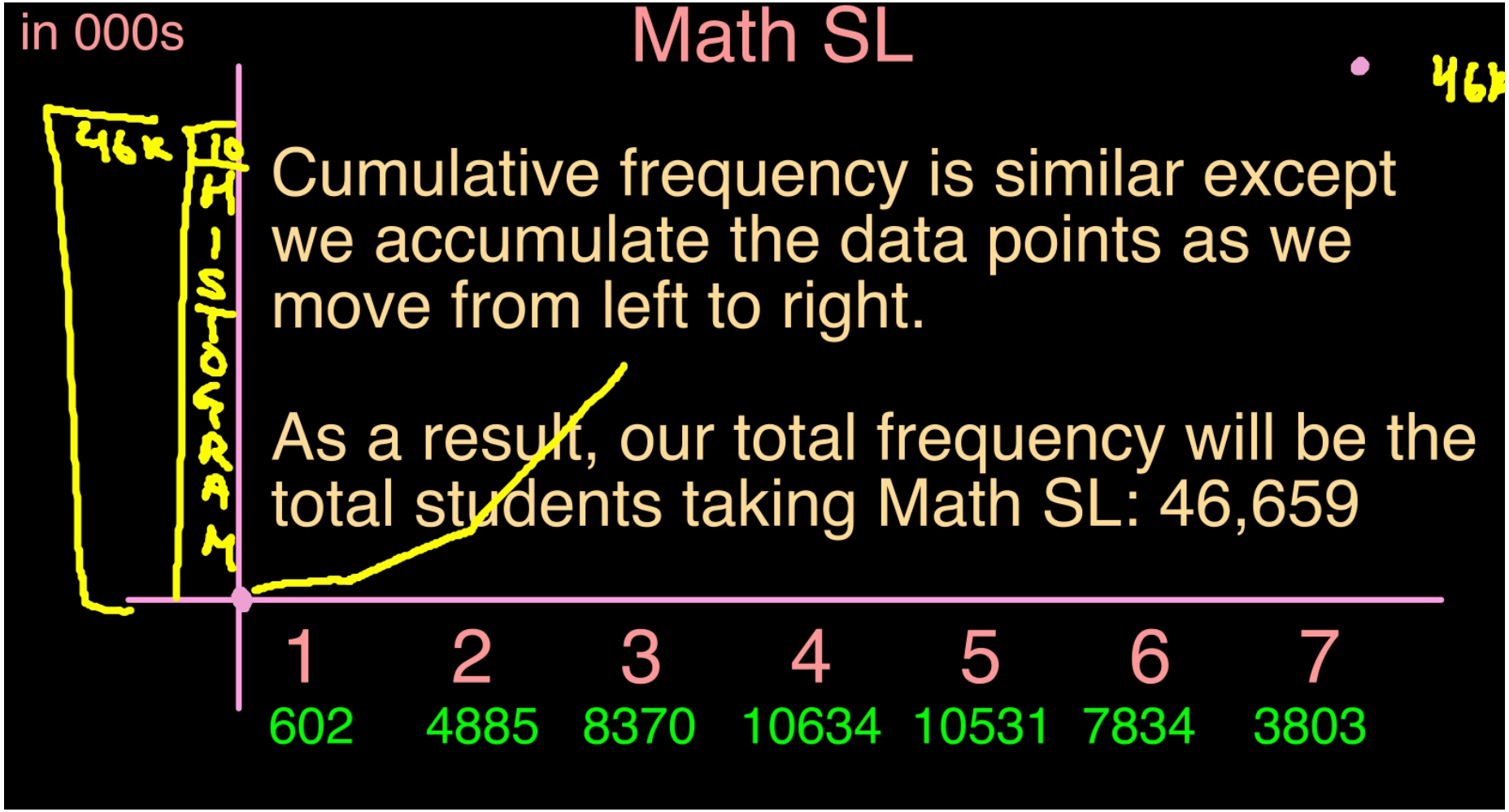

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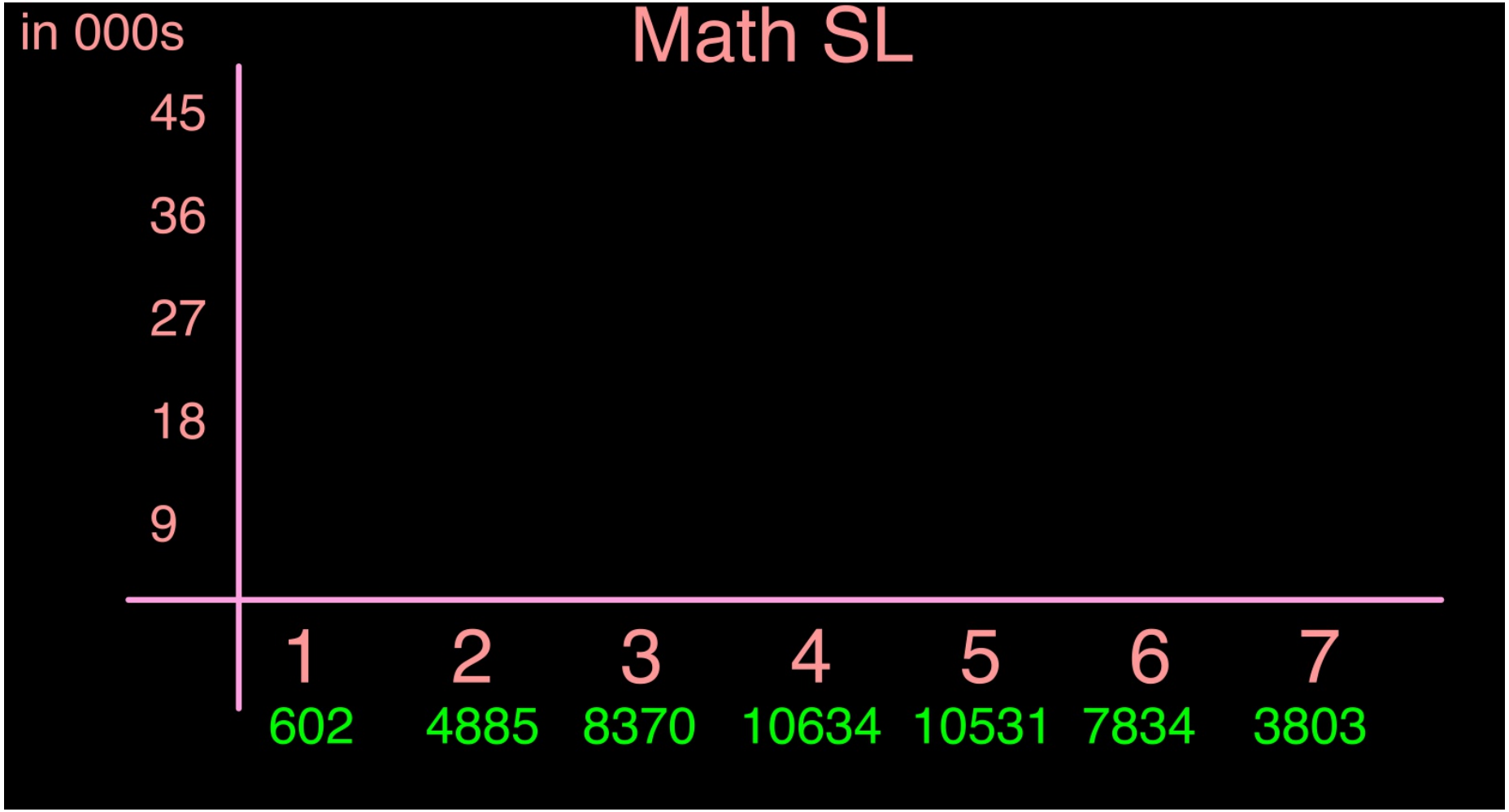

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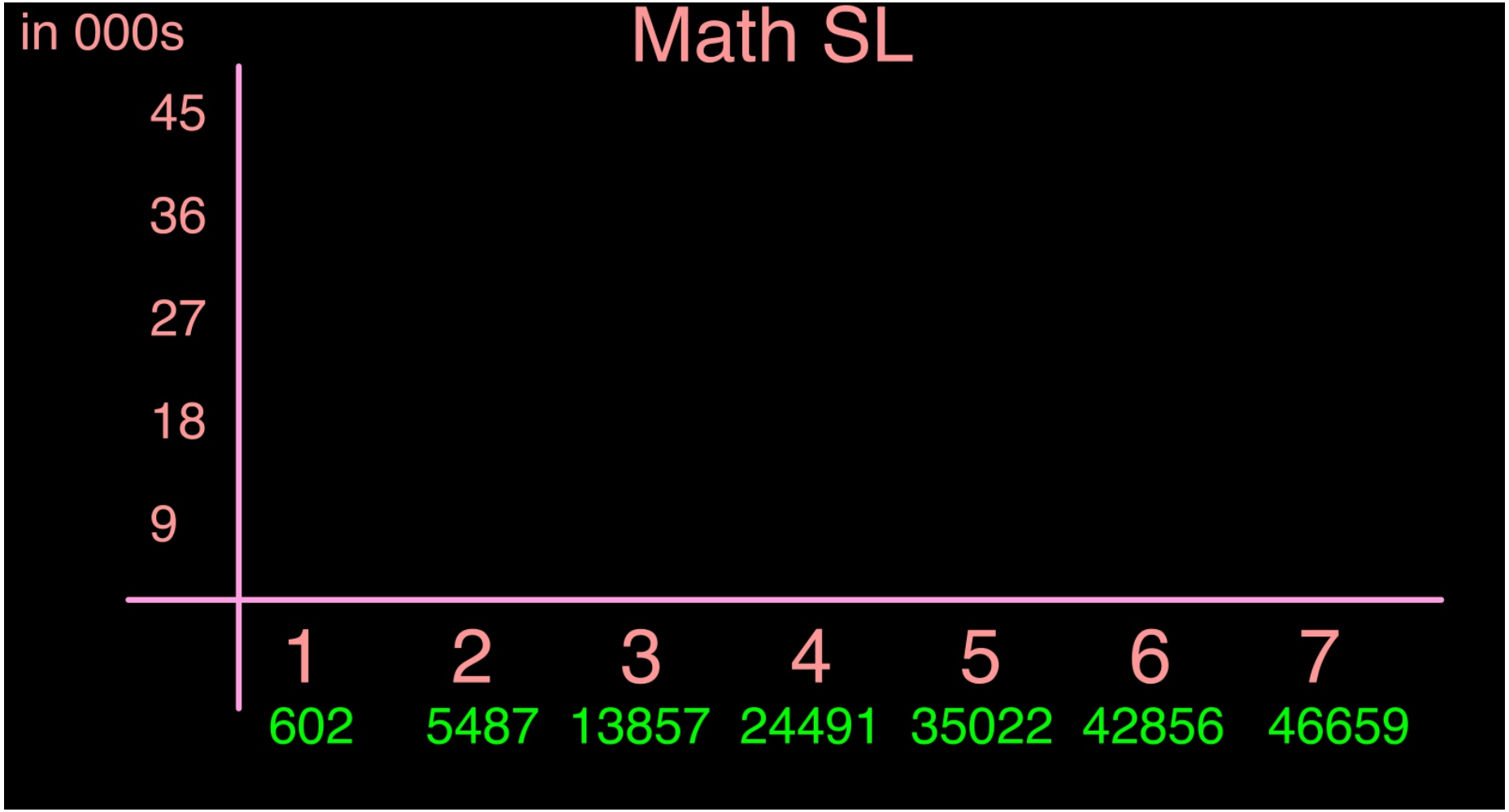

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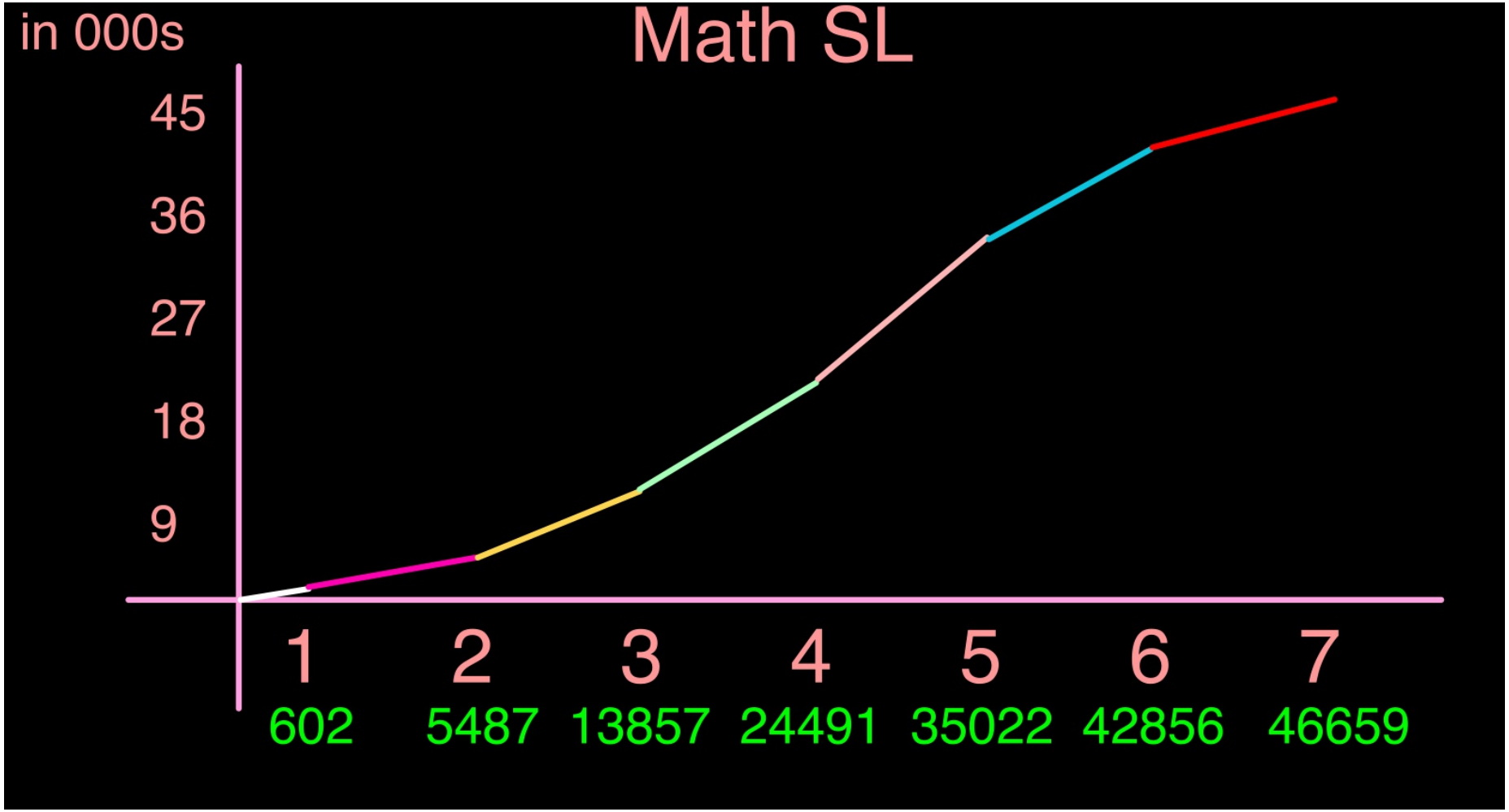

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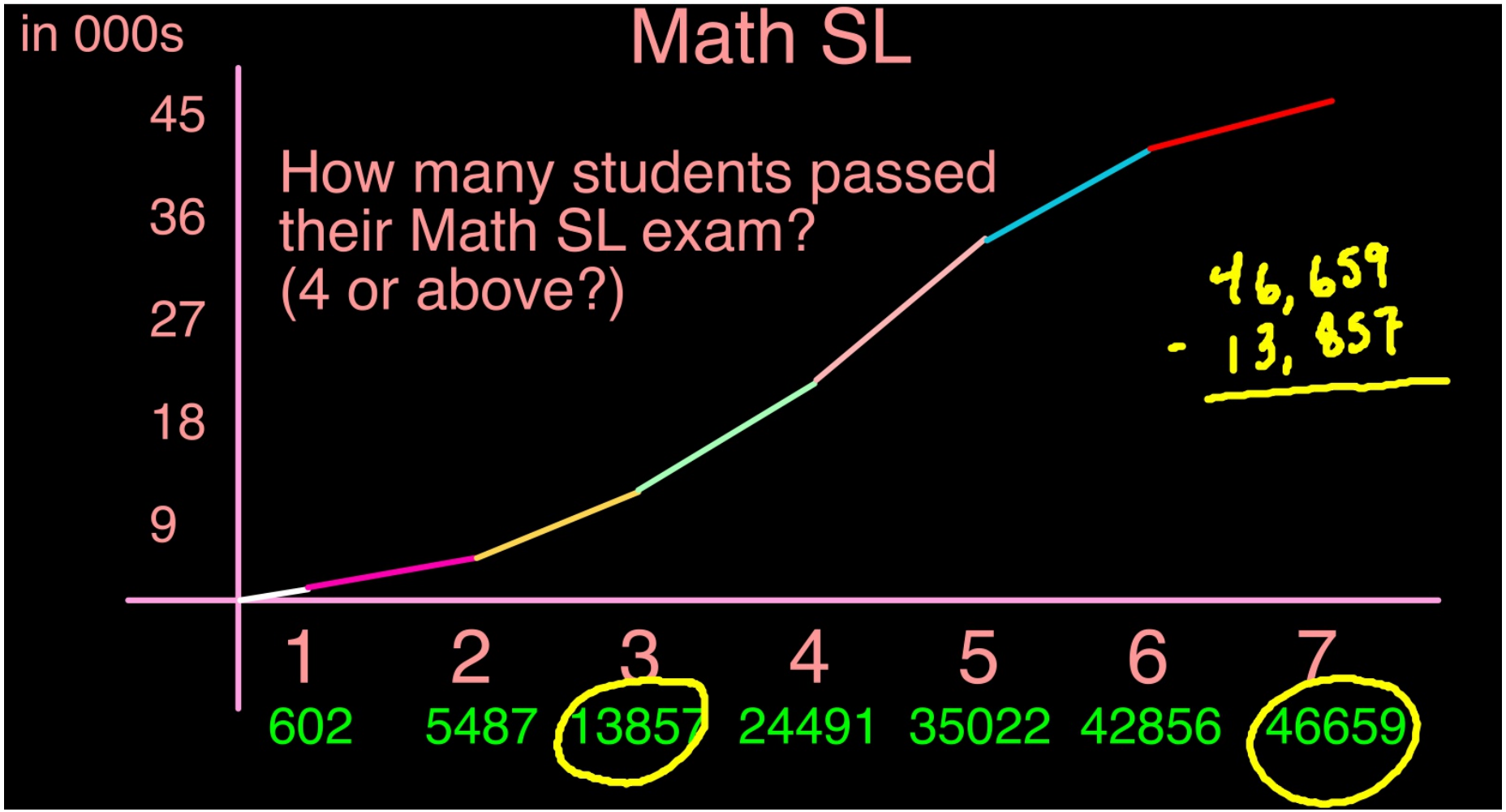

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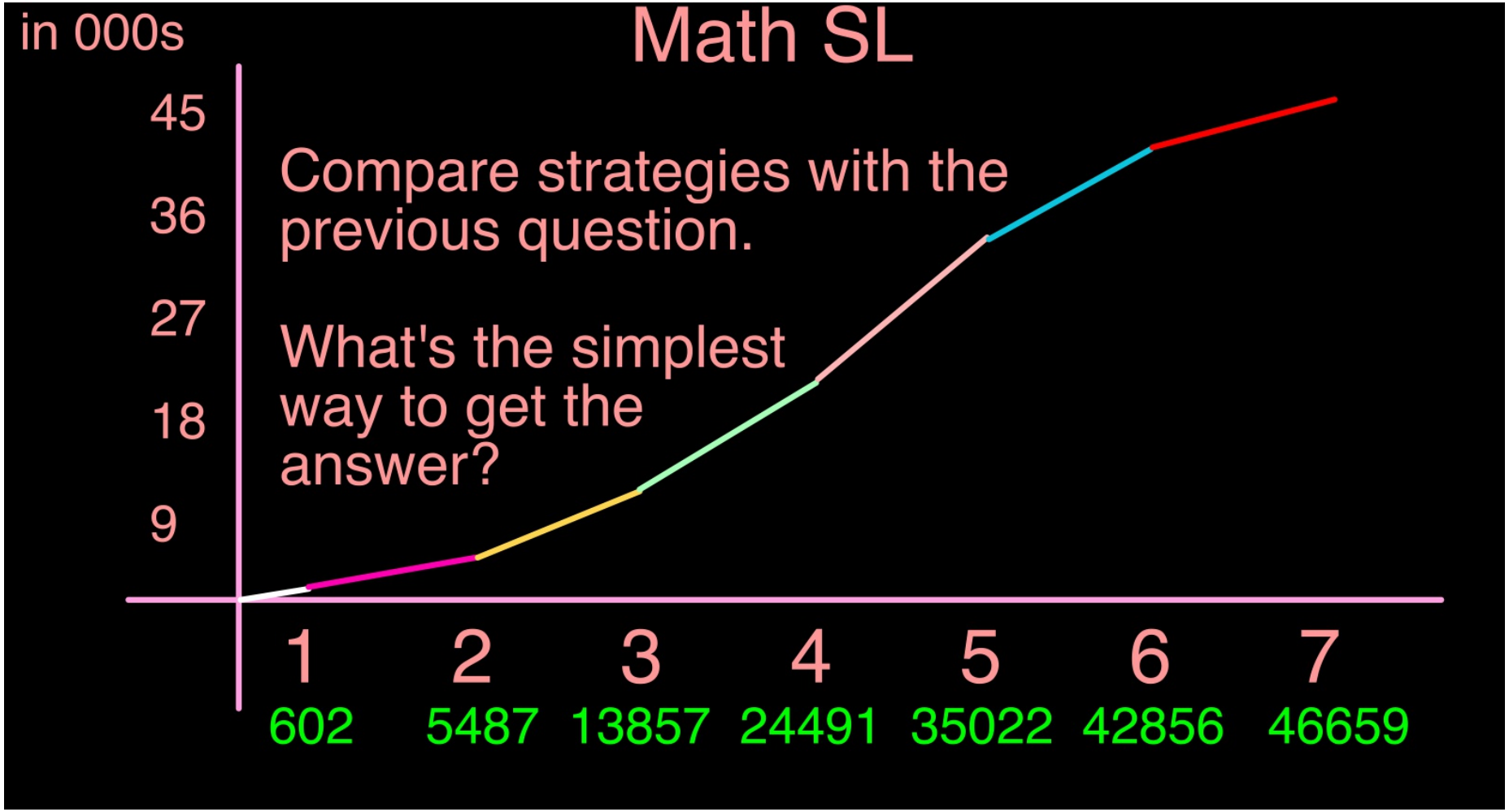

Next objective: Stem-and-Leaf Plot

8 | 46 52 59

Race Running Times in Seconds

Stem	Leaves
12	2 6
13	0 2 5
14	1 2 4 6
15	2 3 7 8
16	1 2 4 6 8
17	5 7 8
18	1 3

Key: 14 | 2 = 14.2 seconds

Explain to a partner how these diagrams work.

Find the median for this set of data. *[non-calc]*

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12	2 6
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15.7

$23/2 = 11.5$

$= 12$

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12	2 6
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18	1 3

Key: 14 | 2 = 14.2 seconds

Median is the 50th percentile term.

We have 23 data points in this diagram, so multiply 23 and 0.5 to get 11.5 -- this means that the 12th data point is in the exact middle of this data distribution.

Therefore, the median is 15.7

Next objective: Box-and-Whisker Plot

Race Running Times in Seconds

Stem	Leaves
12	2 6
13	0 2 5
14	1 2 4 6
15	2 3 7 8
16	1 2 4 6 8
17	5 7 8
18	1 3

Key: 14 | 2 = 14.2 seconds

First, we need data. We'll use the same data from the last problem.

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Stem	Leaves
12	2 6
13	0 2 5
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15	2 3 7 8
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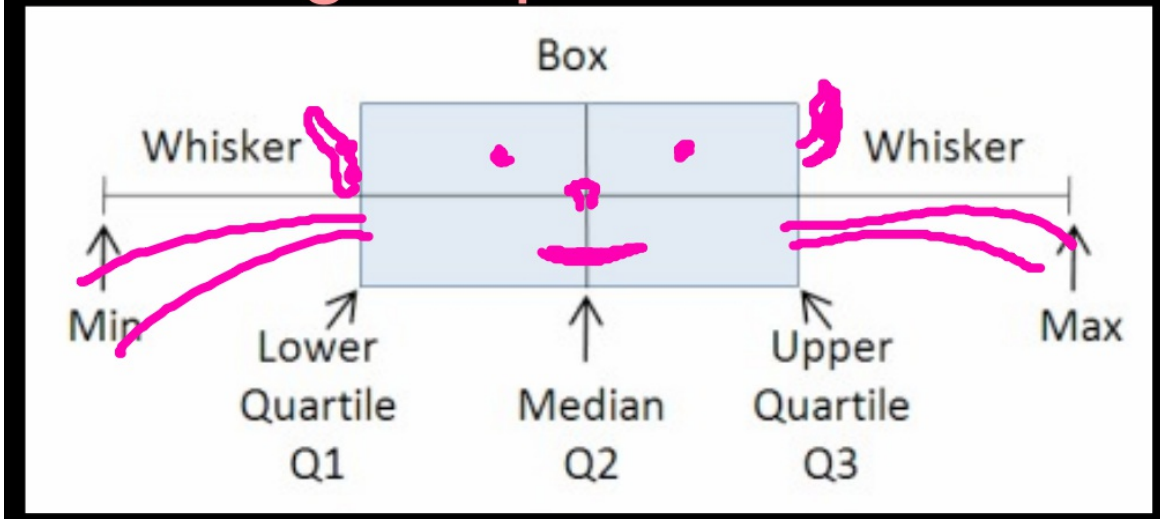
Key: 14 | 2 = 14.2 seconds

A box-and-whisker diagram takes the following shape.



We need the minimum, maximum, Q1, Q3, and median.

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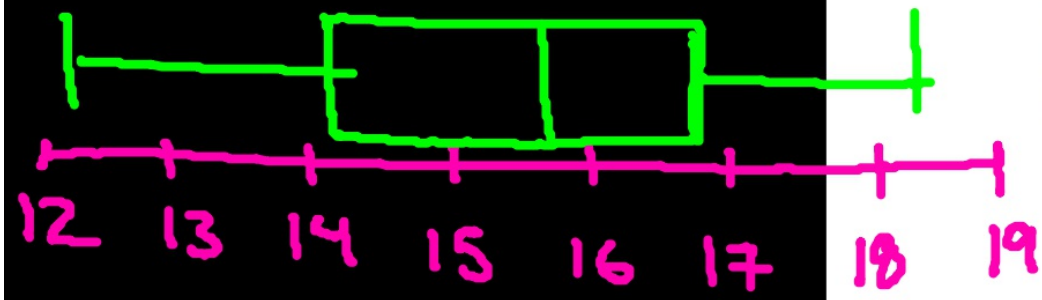
Key: 14 | 2 = 14.2 seconds

We've already found the median: 15.7

Finding the quartiles is a similar process:
There are 23 data points, and since Q1 is also the 25th percentile, we'll multiply 23 by 0.25 to get 5.75.

As a result the 6th term is Q1 which in this data distribution is 14.1

We need the minimum, maximum, Q1, Q3, and median.



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Stem	Leaves
12	2 6
13	0 2 5
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Key: 14 | 2 = 14.2 seconds

Finding the third quartile is a similar process:
Since Q1 is the 6th term, we need to go 6 more terms from the median to arrive at Q3. The median is the 12th term, so 6 more terms gets us to the 18th term.

As a result the 18th term is Q3 which in this data distribution is 16.8

We need the minimum, maximum, Q1, Q3, and median.

Race Running Times in Seconds

Stem	Leaves
12	2 6
13	0 2 5
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17	5 7 8
18	1 3

Key: 14 | 2 = 14.2 seconds

Now we have all the data we need:

Minimum - 12.2
Q1 - 14.1
Median - 15.7
Q3 - 16.8
Maximum - 18.3