



Math Talks: Promoting Discussion for All Students

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What is Number Sense?

- ▶ Write your own definition of number sense.
- ▶ Share your definition with your group and create a comprehensive definition with your group

What is Number Sense?

- ▶ Video
 - ▶ <https://youtu.be/Jeel4Qjow4s>
- ▶ Add/change your definition of number sense based on what you saw in the video

Number Talks/Math Talks

- ▶ What are number talks?
 - ▶ Number talks are brief discussions (5–15 minutes) that focus on student solutions for a math problem. Students share their different processes aloud while the teacher records their thinking. Other students may question, critique, or build on the strategies that are shared
- ▶ Two books for resources
 - ▶ Number Talks by Parrish
 - ▶ Making Number Talks Matter by Humphreys and Richardson

Getting Number Talks Started

1. Students put paper and pencils away (they may need reminding) and put their fists unobtrusively on their chests to show the teacher they are ready.
2. The teacher writes a problem horizontally on the board or document camera.
3. The teacher watches while students solve the problem mentally and put up their thumbs when they have had enough time to think.
4. When most thumbs are up, the teacher asks if anyone is willing to share what they think the answer is. She noncommittally records just the answer on the board and asks if anyone got a different answer, continuing to record each answer that is given.
5. When the teacher is satisfied there are no other answers, she asks if anyone can explain how he or she figured the problem out.
6. When the volunteers begin to share their strategies, they first identify which answer they are defending.
7. After a student shares a strategy, there are several things a teacher might ask in order to work with that student's thinking. (Explore thinking, ask for an explanation...)
8. Number Talks don't naturally end after 15 minutes; often they can go much longer if you let them-and sometimes you may want to let them.

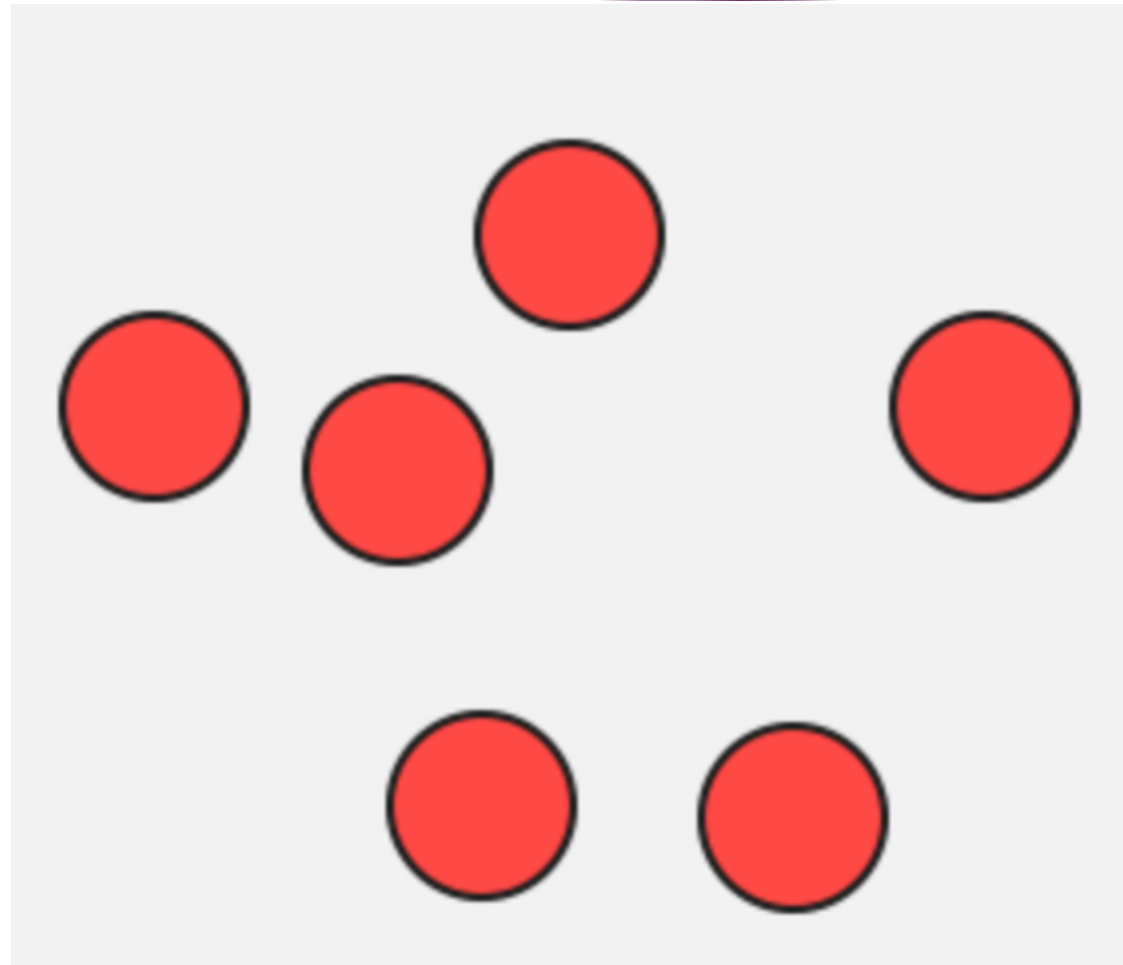
(Humphreys and Parker)

Four Procedures and Expectations Essential to Number Talks

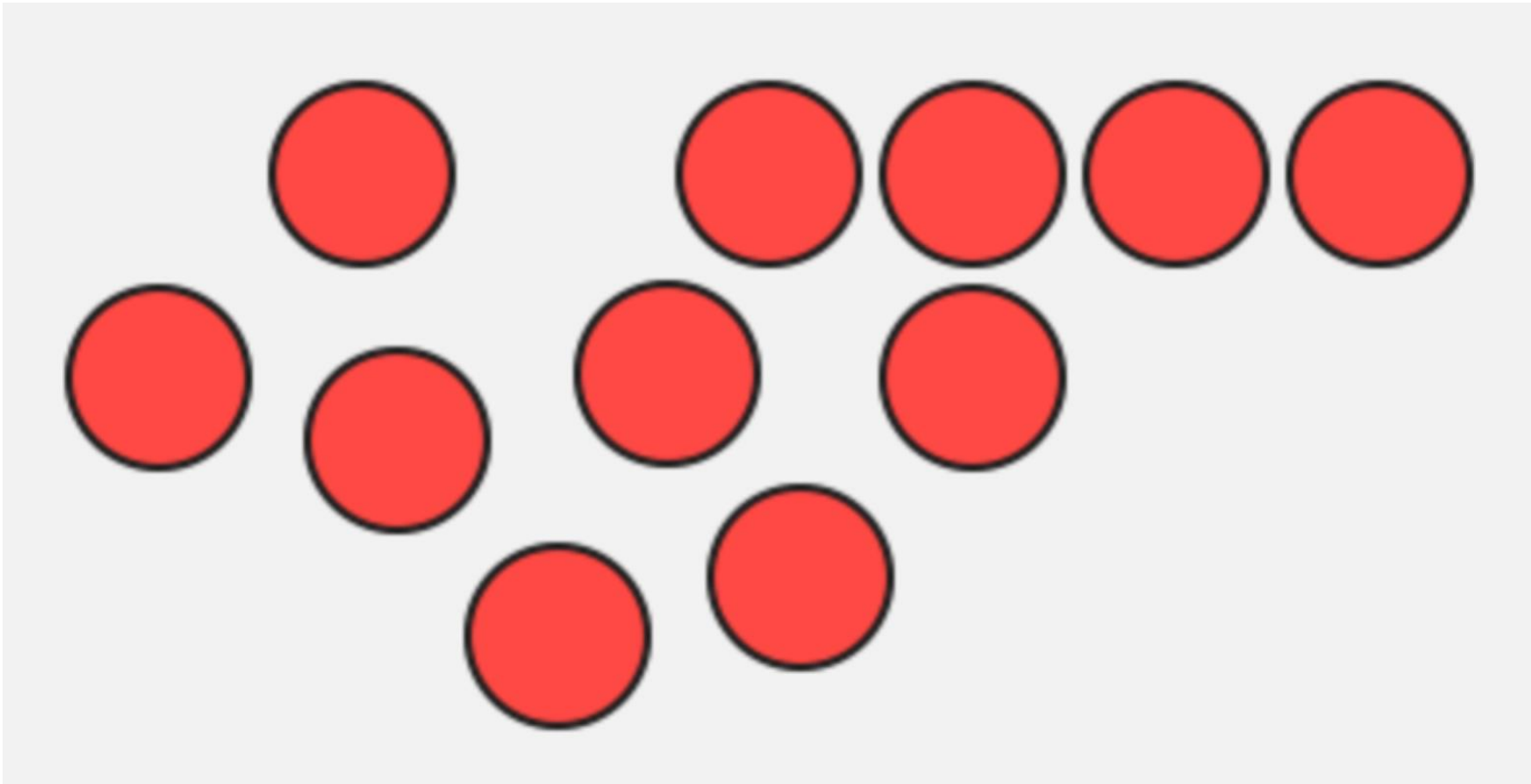
(from *Number Talks* by Sherry Parrish)

- Select a designated location that allows you to maintain close proximity to your students for informal observations and interactions.
- Provide appropriate wait time for the majority of students to access the problem.
- Accept, respect, and consider all answers.
- Encourage student communication throughout the number talk.

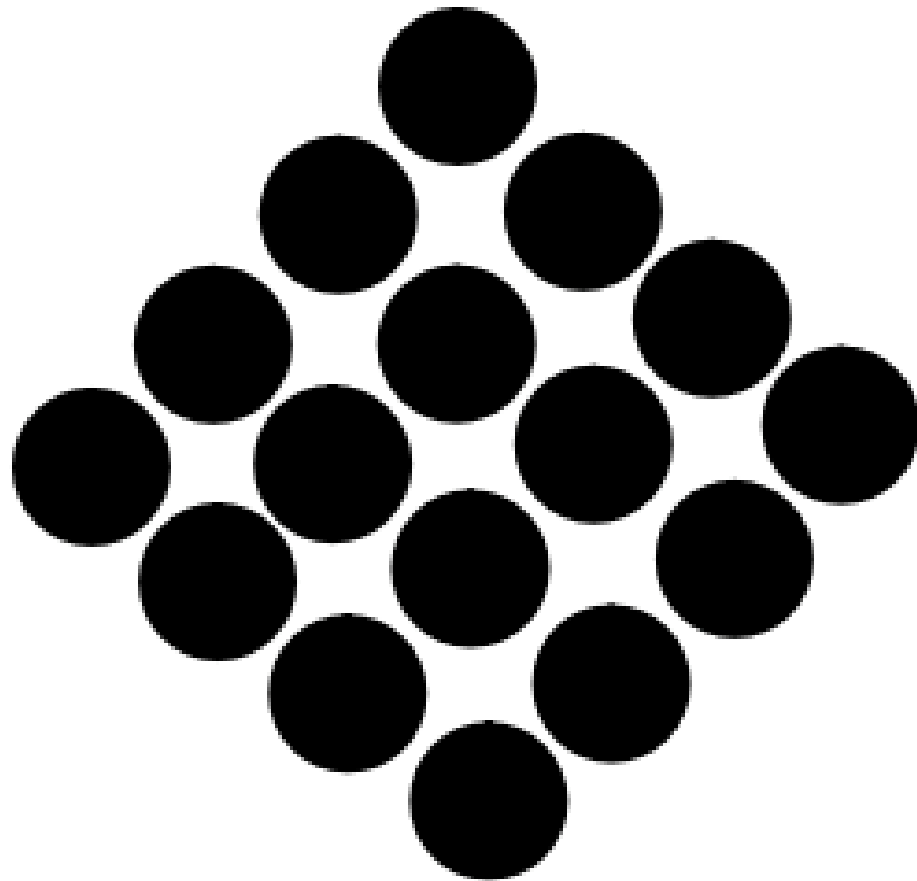
Quick Image #1



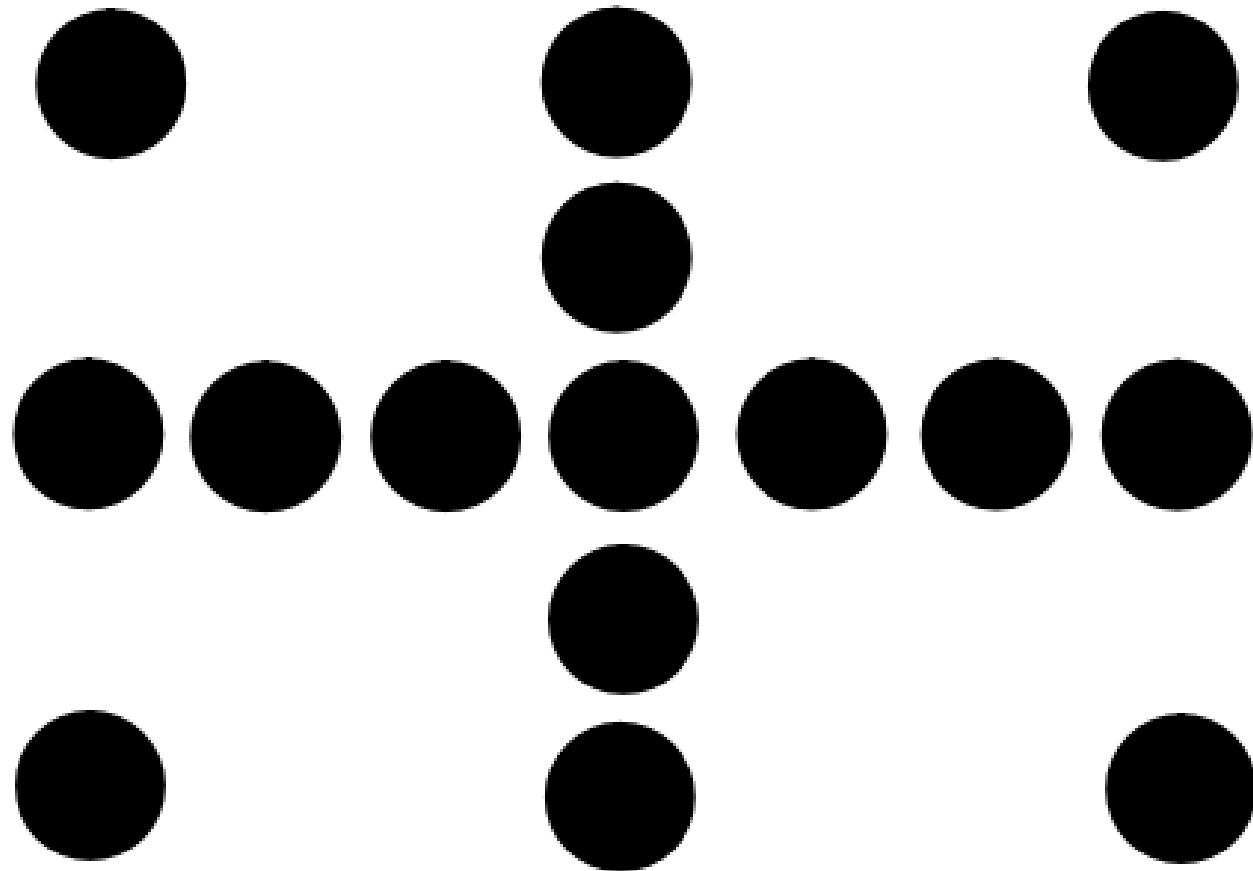
Quick Image #2



Quick Image #3



Quick Image #4



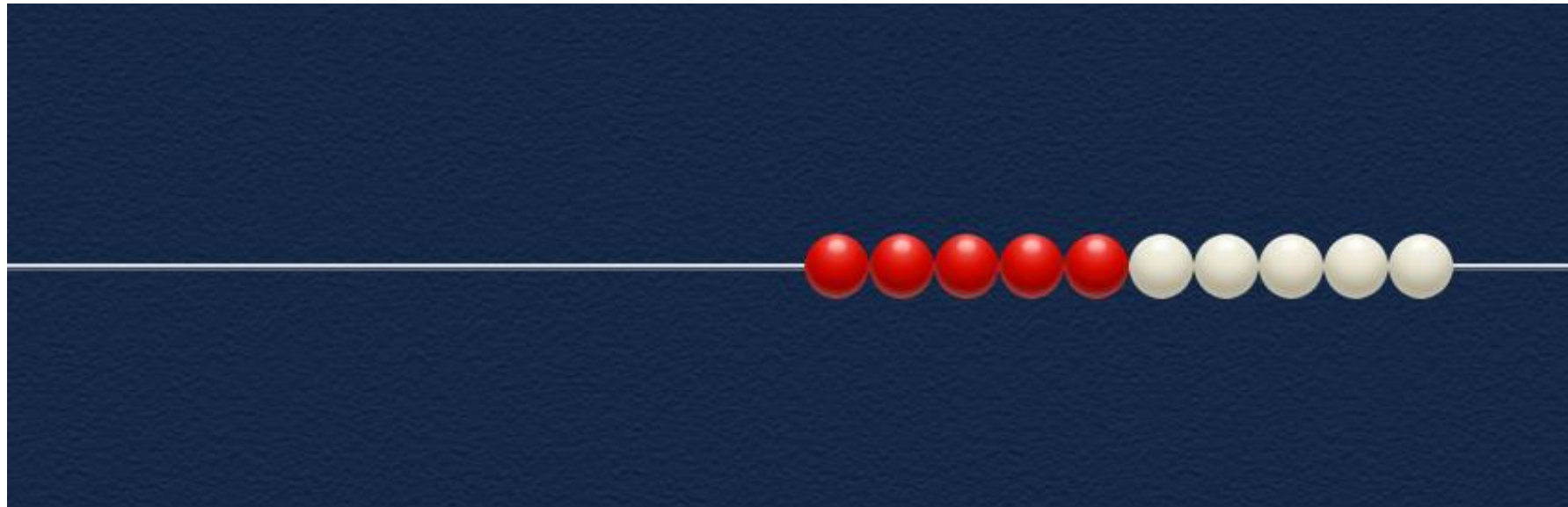
Unpacking the Mathematics

- ▶ Thinking about these cards what was the mathematical or other goal of the number talk?

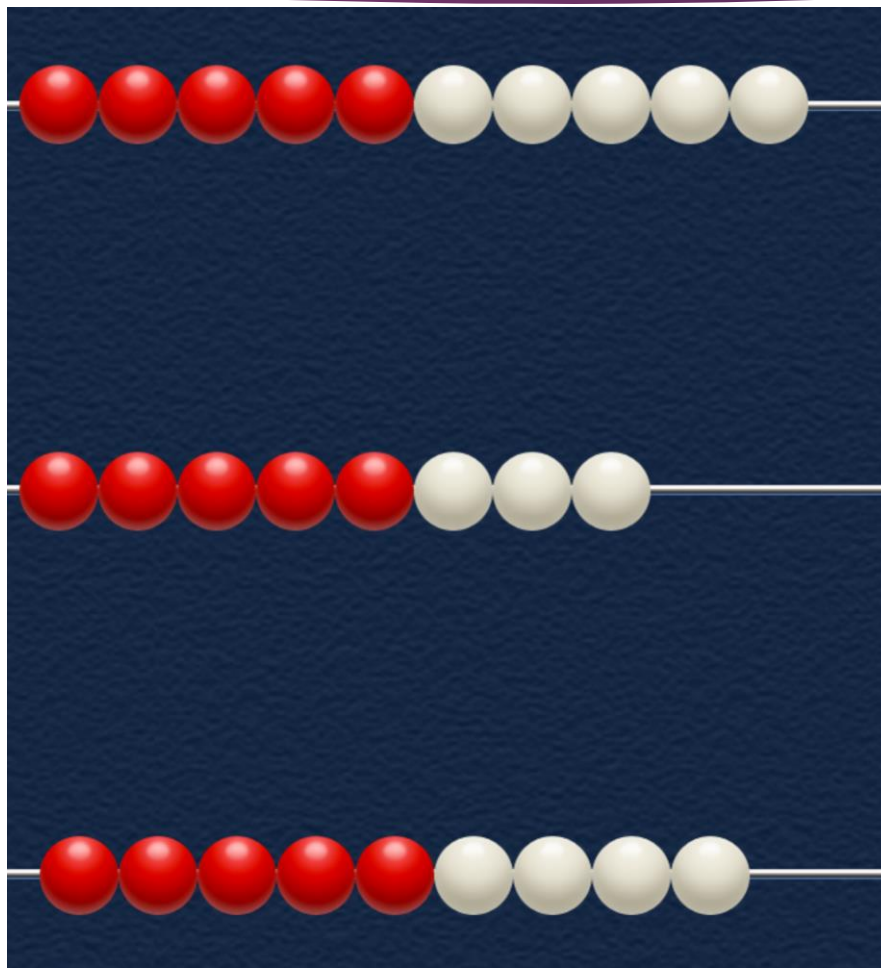
Resources

- ▶ Bridges math apps
- ▶ [Mathlearningcenter.org](https://mathlearningcenter.org)
 - ▶ Go to the math apps page

Prep for Quick Image #5



Quick Image #5



Number Talk Videos

- ▶ Jo Boaler

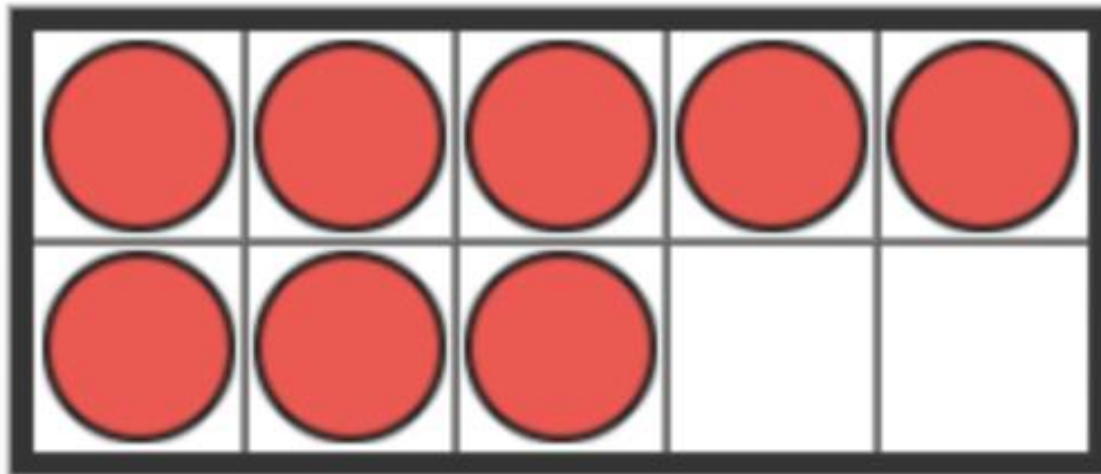
- ▶ <https://www.youtube.com/watch?v=YKegyzRj8-k>

- ▶ Sherry Parrish

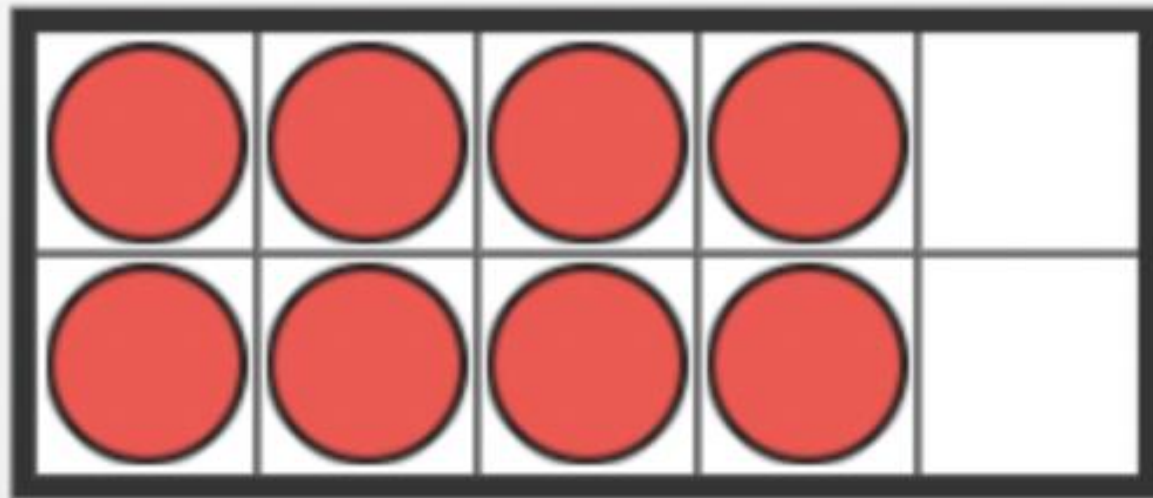
- ▶ DVD

- ▶ https://www.youtube.com/watch?v=x-4TcSc_3pE&feature=youtu.be

Kindergarten Number Talk: A



Kindergarten Number Talk: B



Unpacking the Mathematics

- ▶ Thinking about these cards what was the mathematical or other goal of the number talk?

Now you try some...

- ▶ Use the practice number talks in your group. Each person should lead a number talk.
- ▶ When are finished, consider the mathematics that was contained in the number talk. What other problems/cards/questions might you have included?

Reflection

- ▶ How can number talks support or disrupt dominant patterns in the mathematics classroom?
- ▶ What is the value of encouraging multiple solution strategies?



Leading a Group Discussion

Discussion

- ▶ Why are discussions important?
- ▶ How can discussions foster or disrupt dominant patterns of inequity?

From Teaching Works

- ▶ **How does leading a group discussion advance justice?**
- ▶ The free and fair exchange of ideas is foundational for democracy. This requires the ability to share, justify and defend one's ideas and to listen attentively and thoughtfully to the ideas and perspectives of people different from oneself. In classrooms, students practice the skills of reasoned argument, debate, and collective knowledge-building toward common goals. Group discussions provide opportunities for students to make sense of complex ideas together and support one another to speak and listen in ways that advance the classroom community and common good. Group discussions also have the potential to reproduce patterns of inequity in classrooms, so teachers work to identify and disrupt these patterns in all areas of the discussion from selecting a task that will make space for a wide range of student strengths to concluding in a way that positions students as capable.

Video: True/False sentences

- ▶ https://www.youtube.com/watch?time_continue=1&v=hCxjKTJ9xxQ

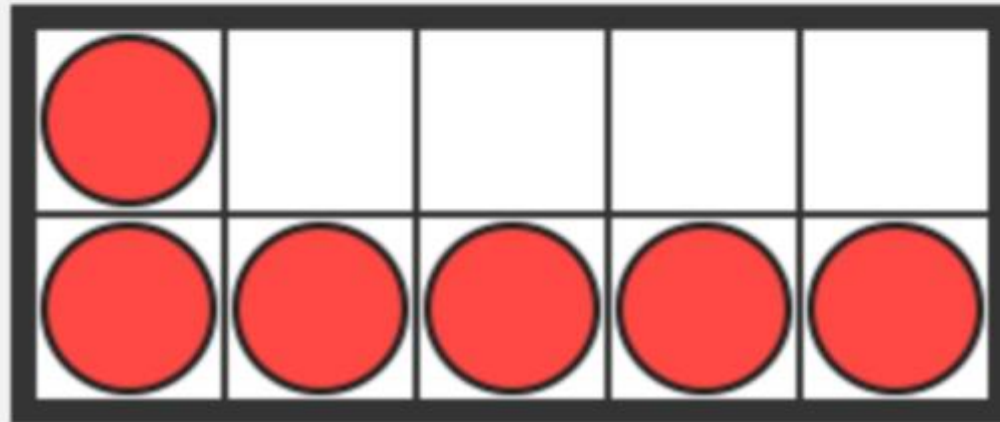
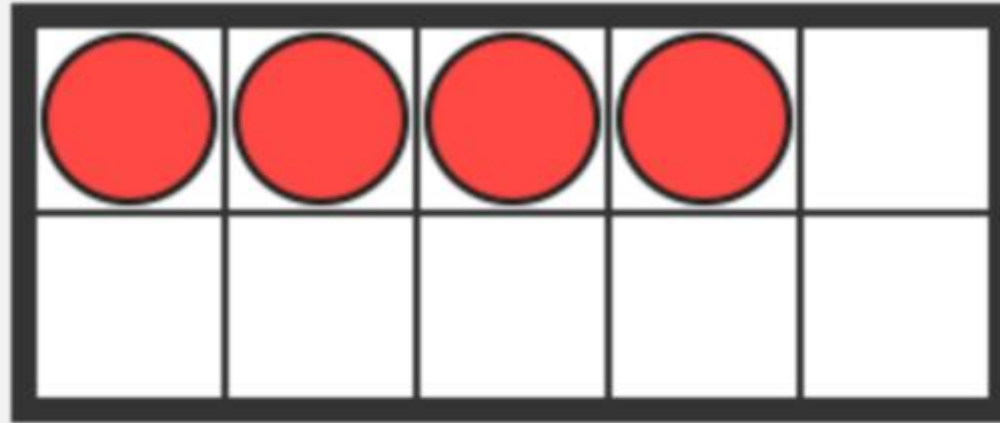
From the video

- ▶ What did you see?
- ▶ What did you notice?

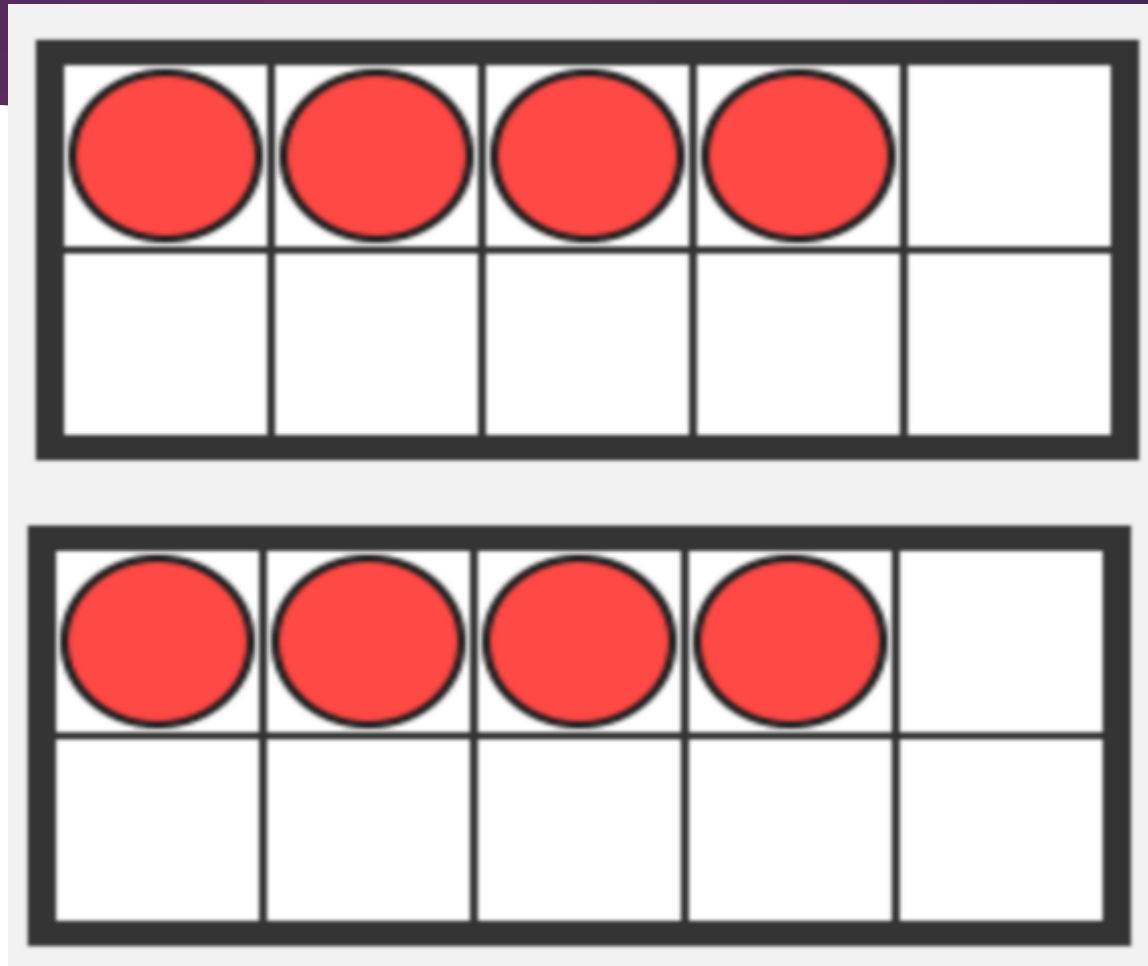
Write your own number talk

- ▶ Create a number talk with a mathematical goal
 - ▶ This can be similar to the ones we practiced
 - ▶ Identify the mathematical goal and the mathematics needed to solve the task
 - ▶ Consider different solutions
 - ▶ Practice in your group

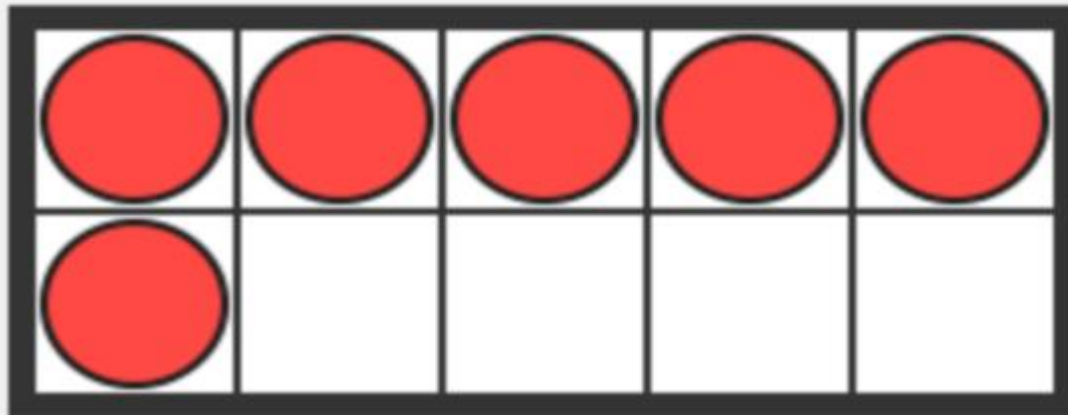
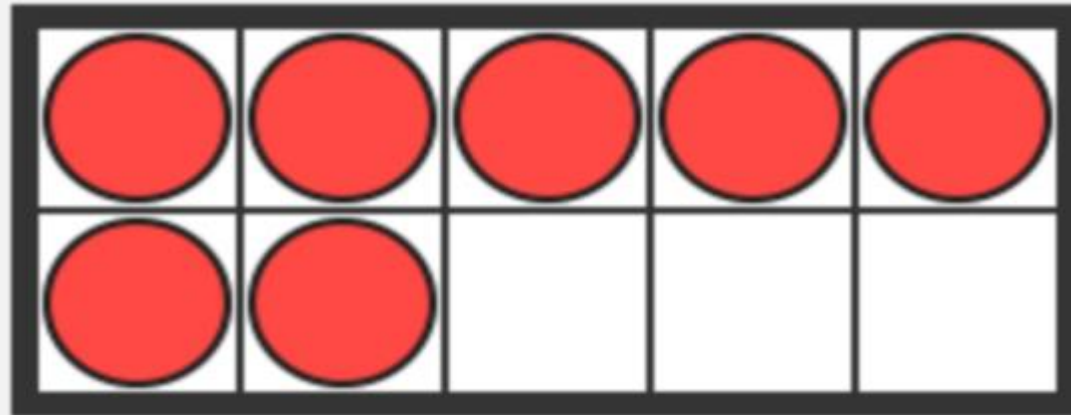
Grade 1 Number Talk: A



Grade 1 Number Talk: B



Grade 1 Number Talk: C



Number Talks for Multiplication

▶ 26 x 19

Number Talks for Middle School

Which is greater?

$$\frac{9}{19} \quad \frac{7}{18}$$

Try another

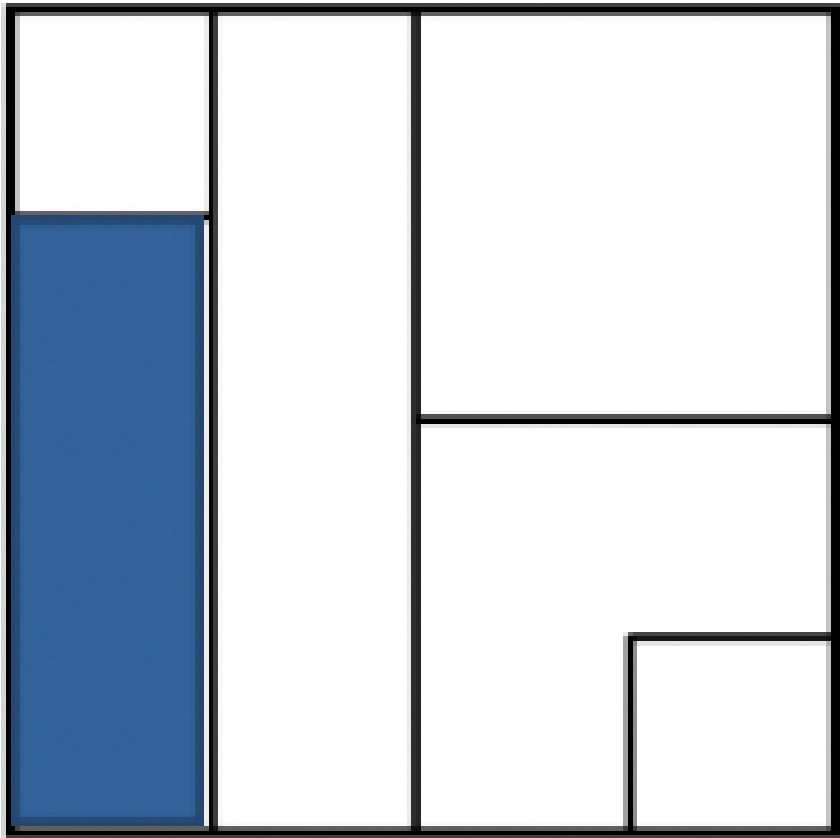
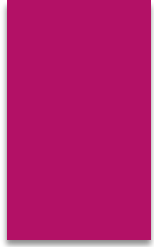
What is 8% of 125?

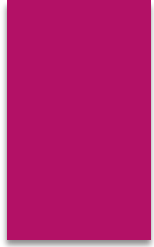
Expanding the idea of number talks

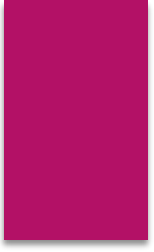
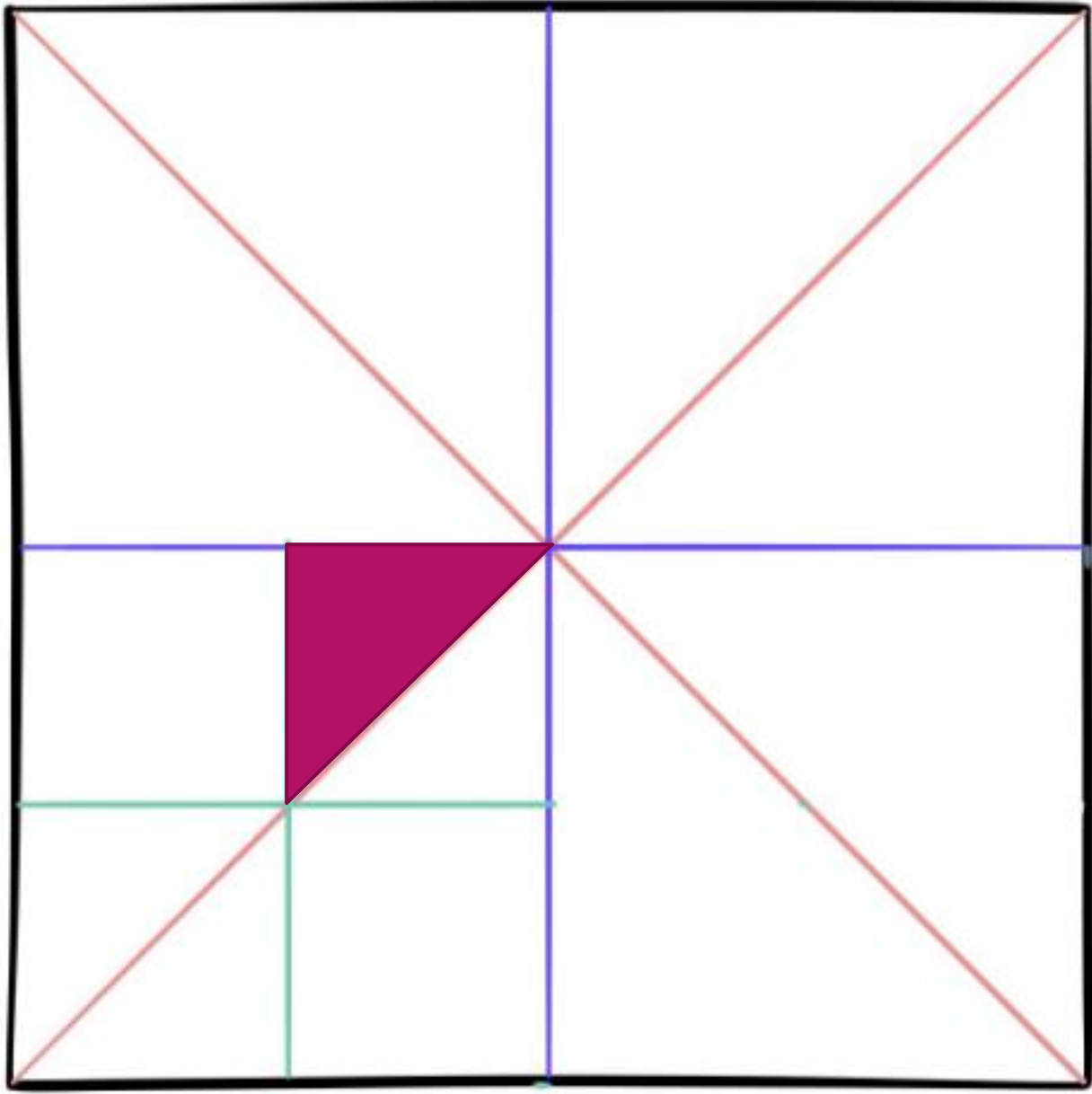
- ▶ How might you use this idea to teach other ideas beyond number sense?

Fraction Talks

▶ <http://fractiontalks.com/how-to/>







Which one doesn't belong?

▶ <https://wodb.ca/numbers.html>

Which one doesn't belong?

9	16
25	43

Which one doesn't belong?

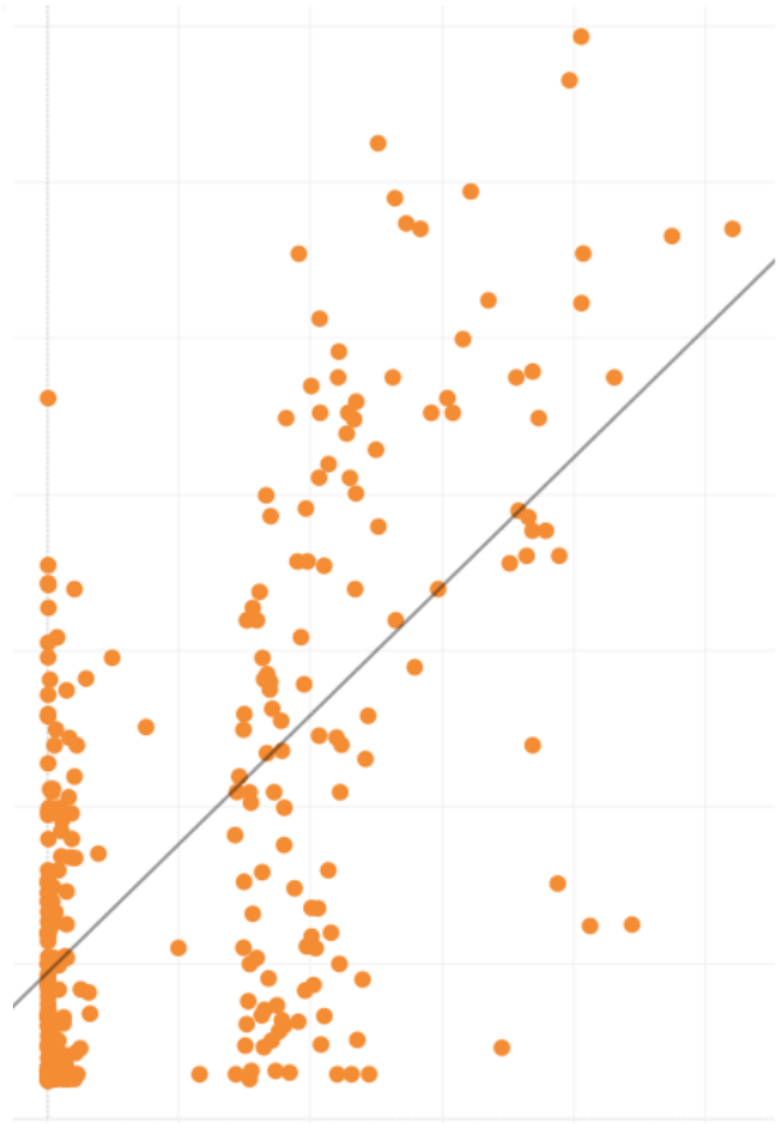
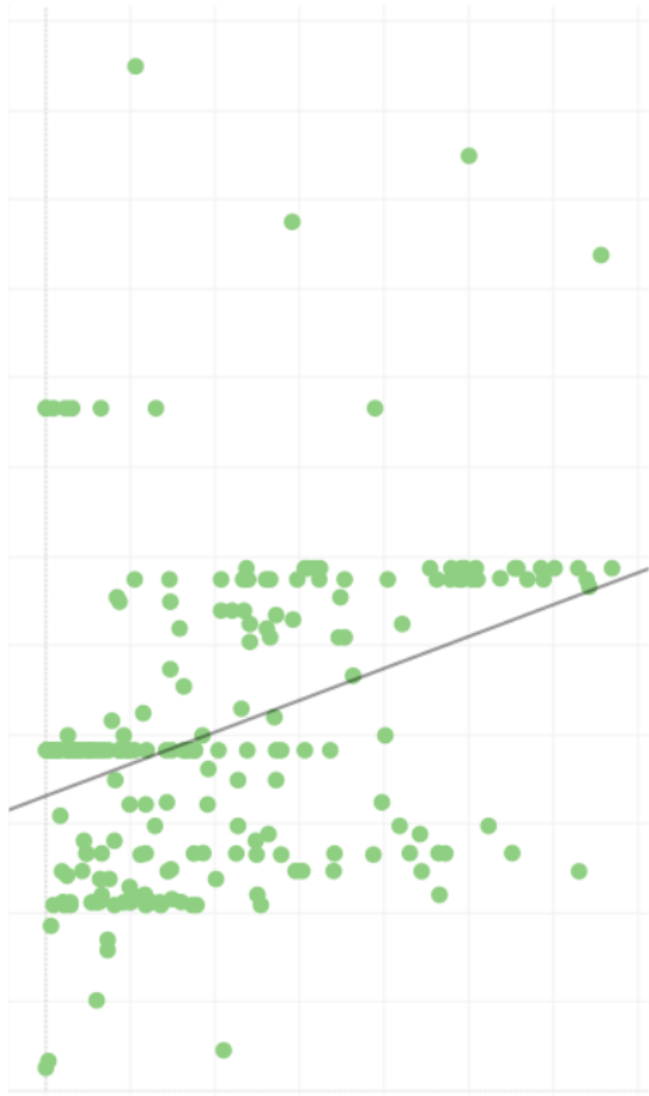
$3x$	-3
$-3x^2$	$-5x$

Which one doesn't belong?

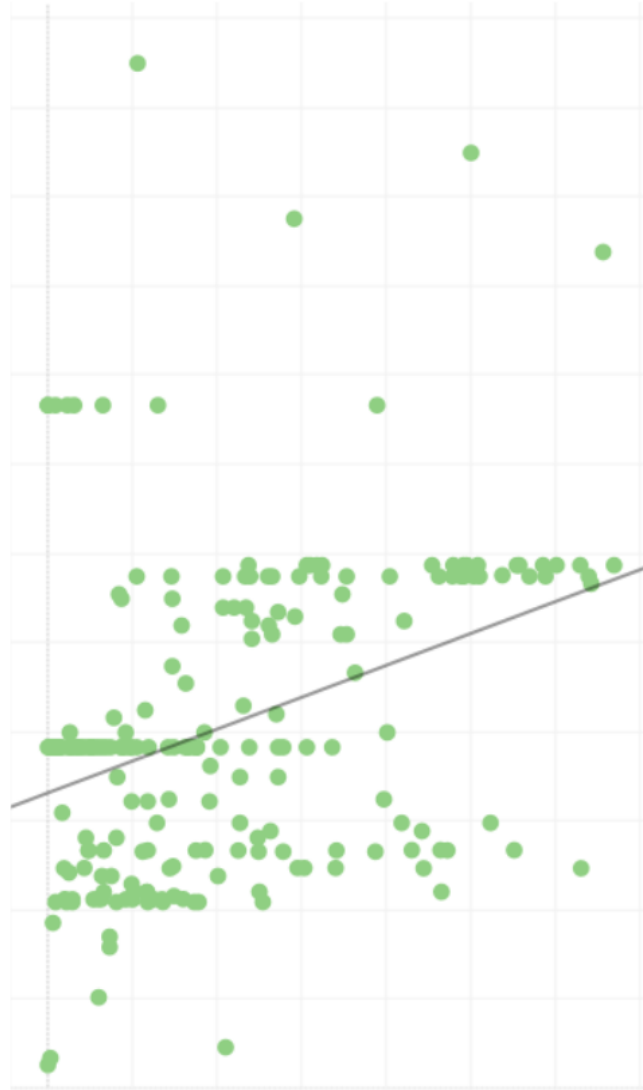
$5 + 5$	$2 + 8$
$9 + 1$	$3 + 9$

Slow Reveal Graphs

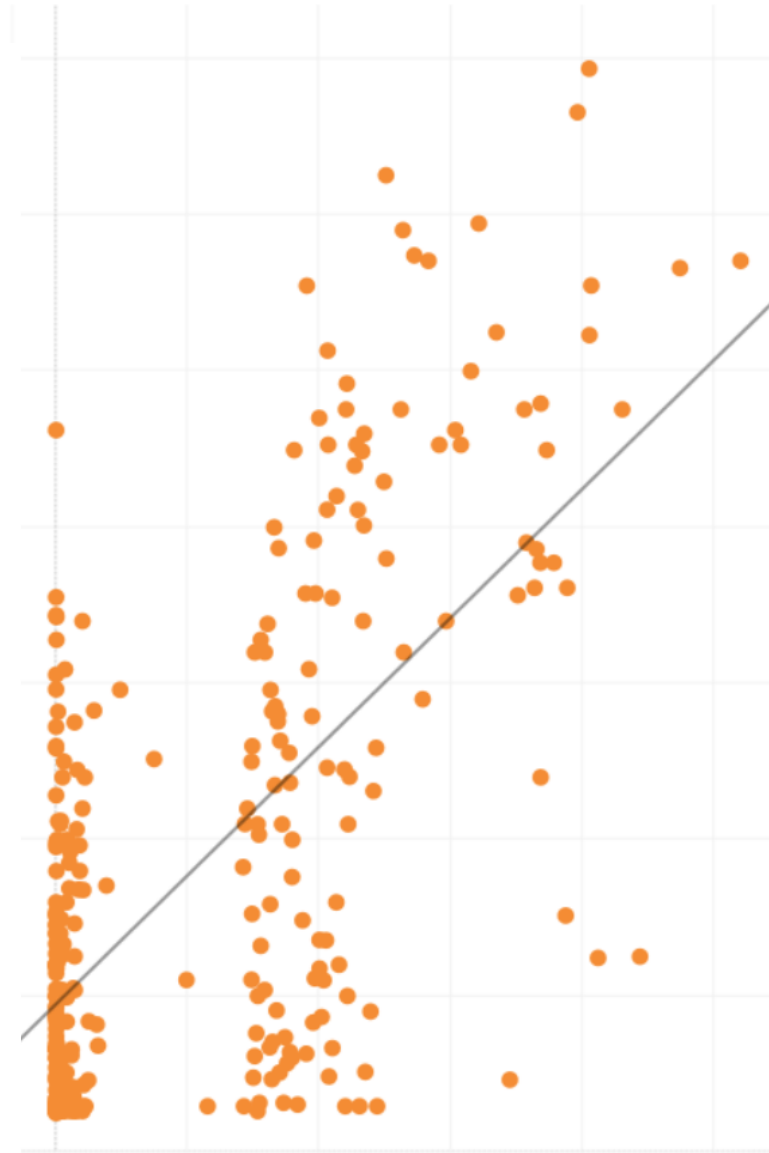
- ▶ <https://medium.com/the-sports-scientist/why-do-wnba-players-earn-7-times-less-than-their-counterparts-in-the-nba-872a82d1a364>
- ▶ https://docs.google.com/document/d/1-12VI1BRcjCr8URAmk0MjiYy_GsjaSaKATt6aATHs0w/edit
- ▶ <https://slowrevealgraphs.com/>



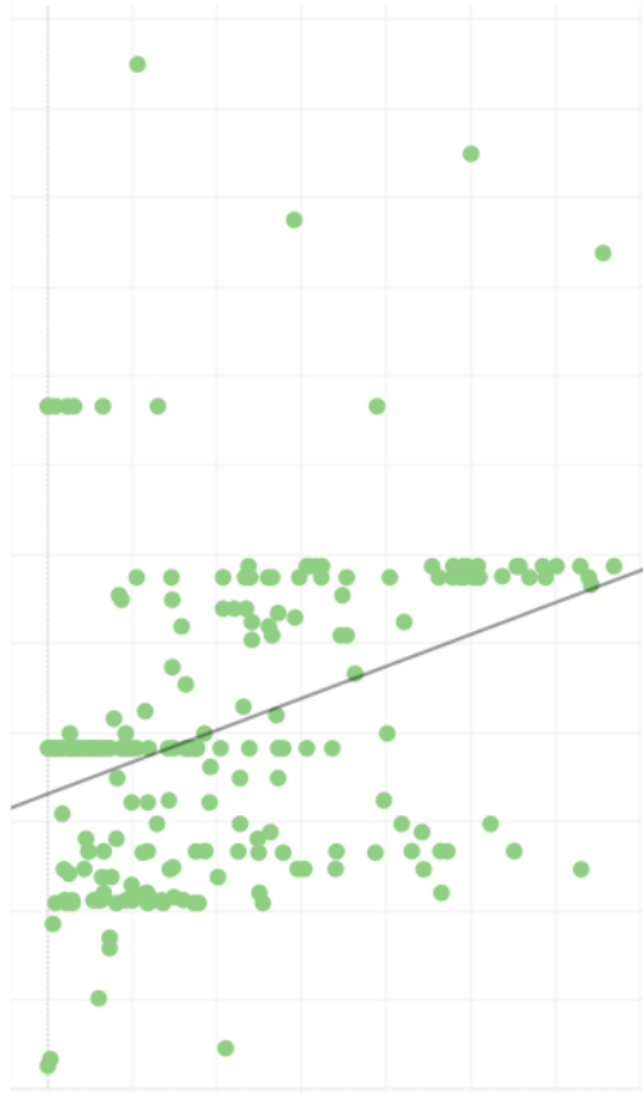
Relationship b/w Points and Salaries(WNBA)



Relationship b/w Points and Salaries(NBA)

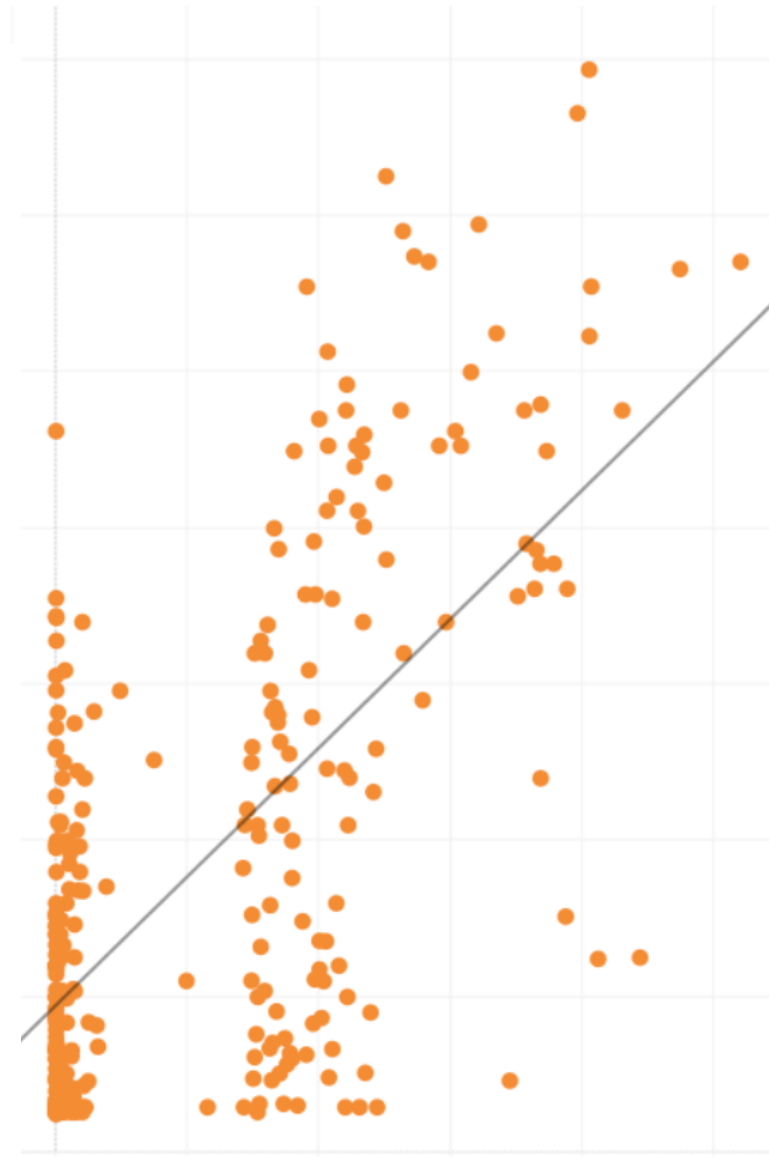


Relationship b/w Points and Salaries(WNBA)



Points Scored

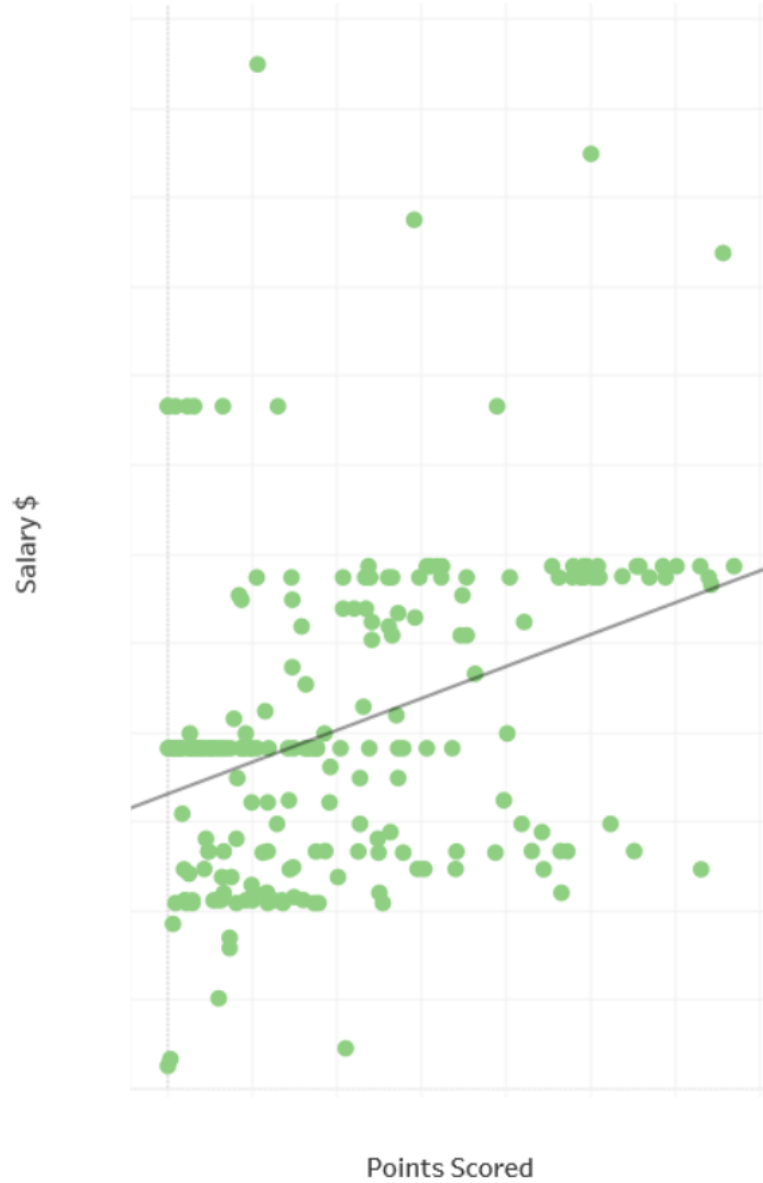
Relationship b/w Points and Salaries(NBA)



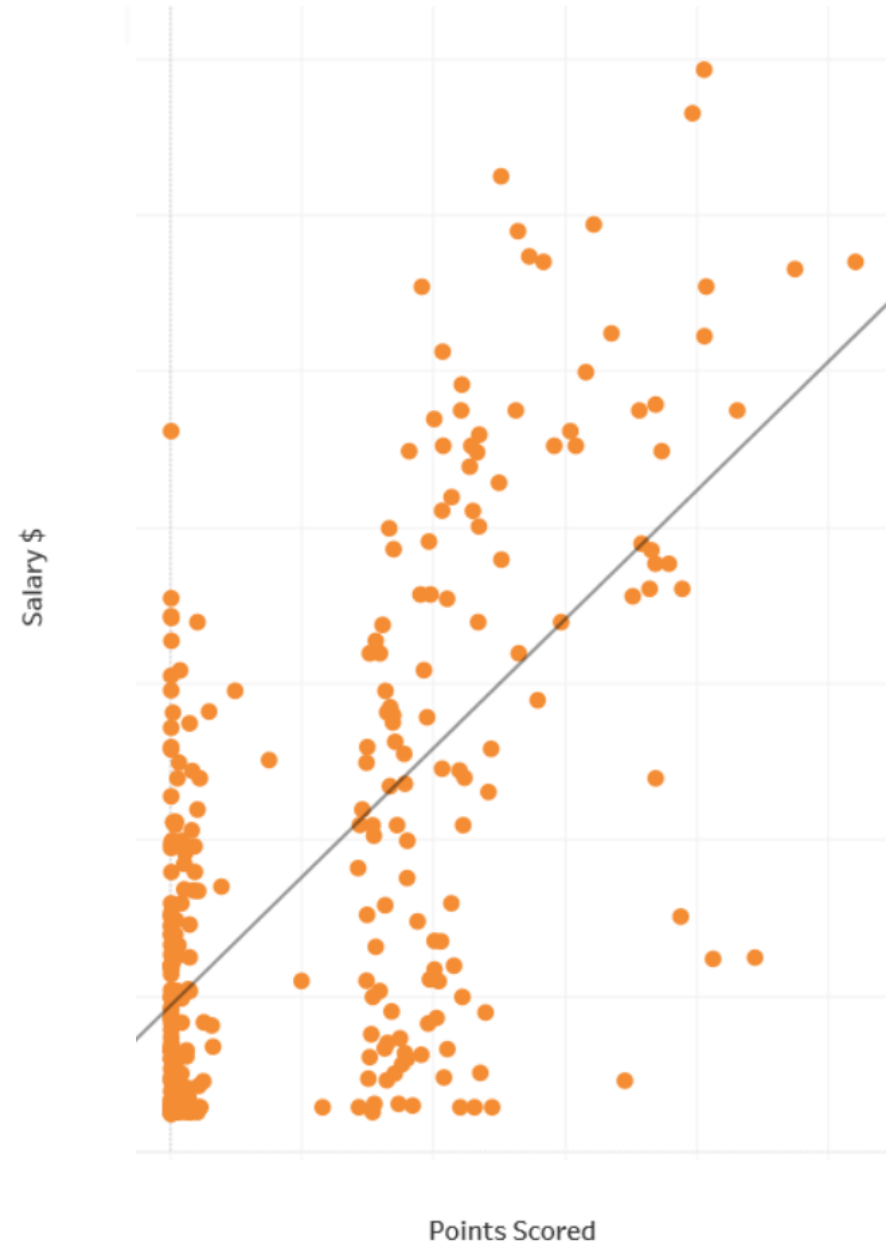
Points Scored



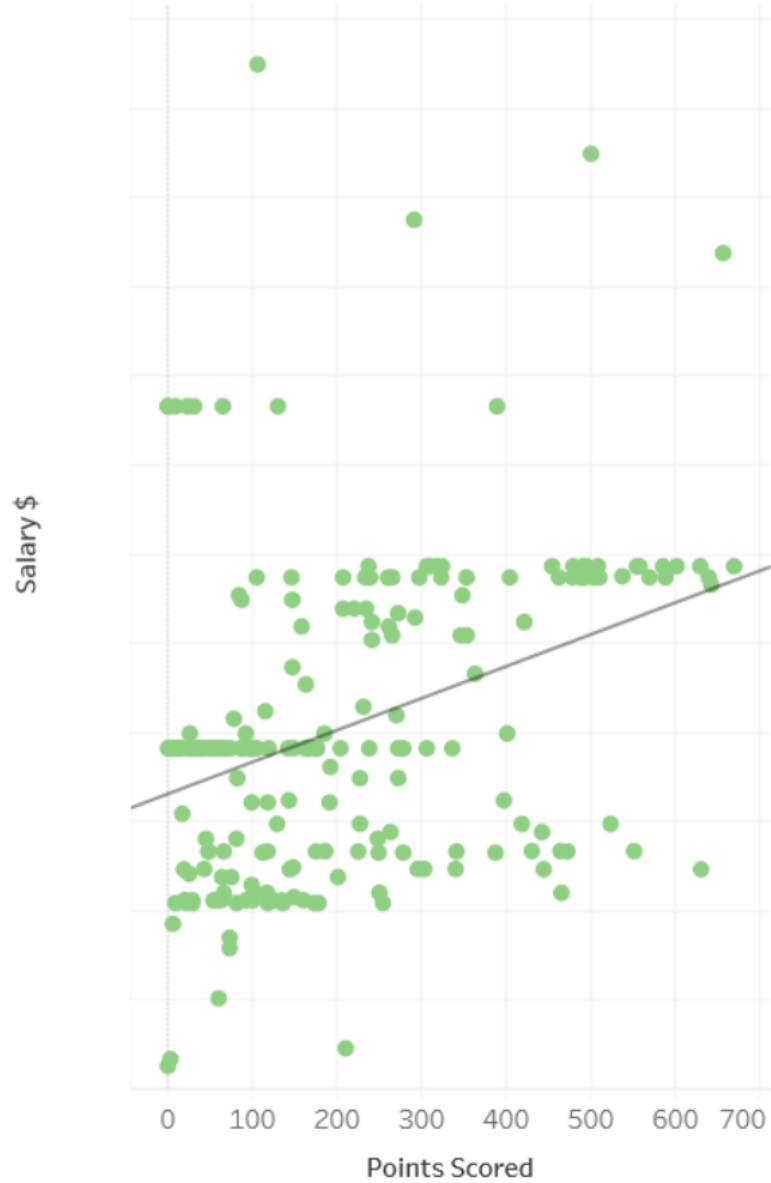
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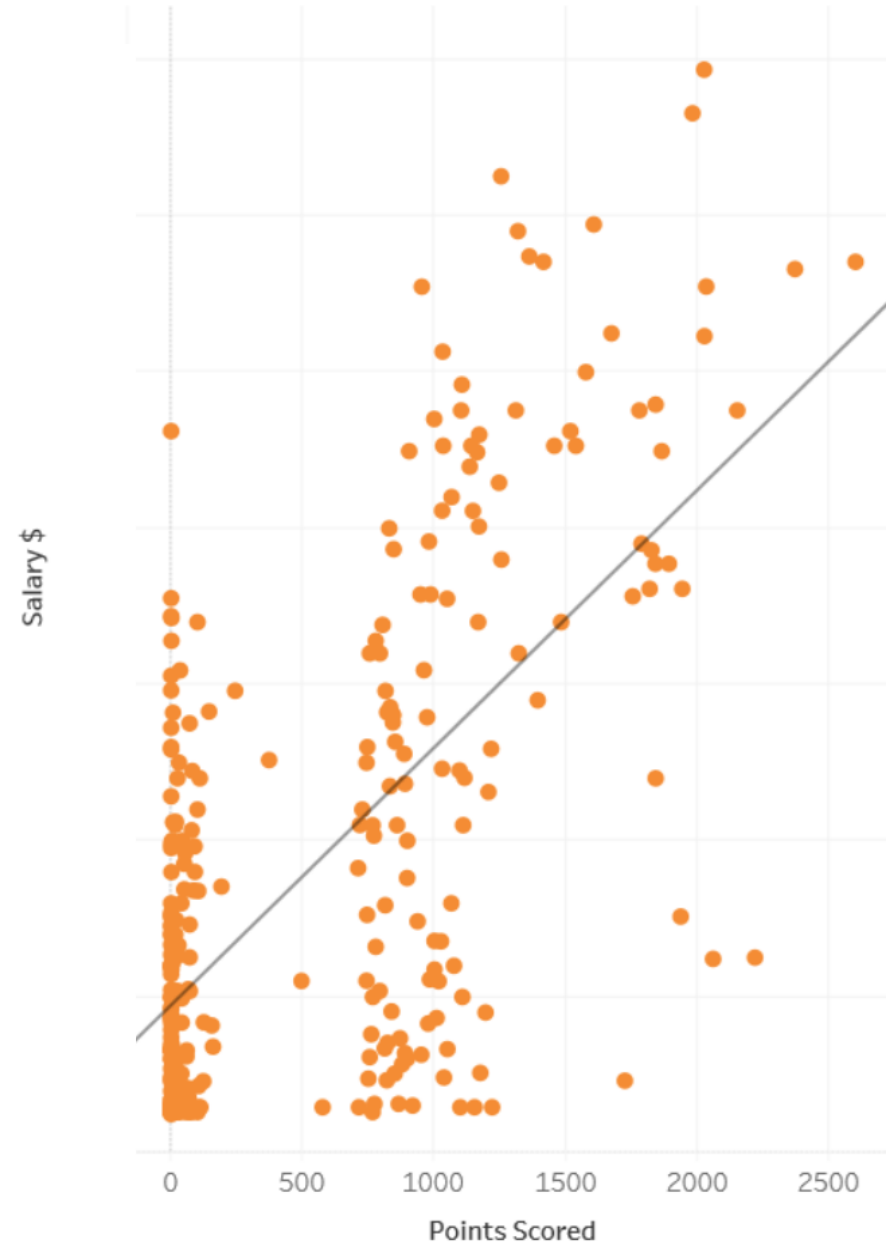
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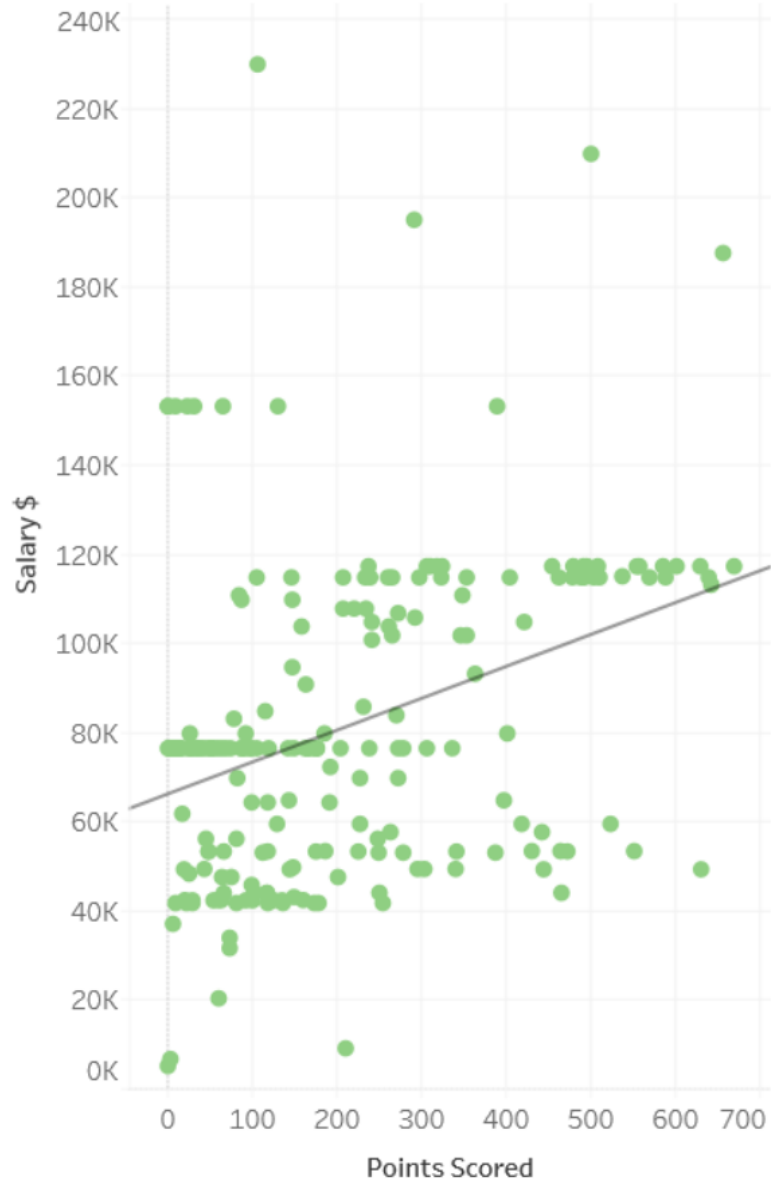
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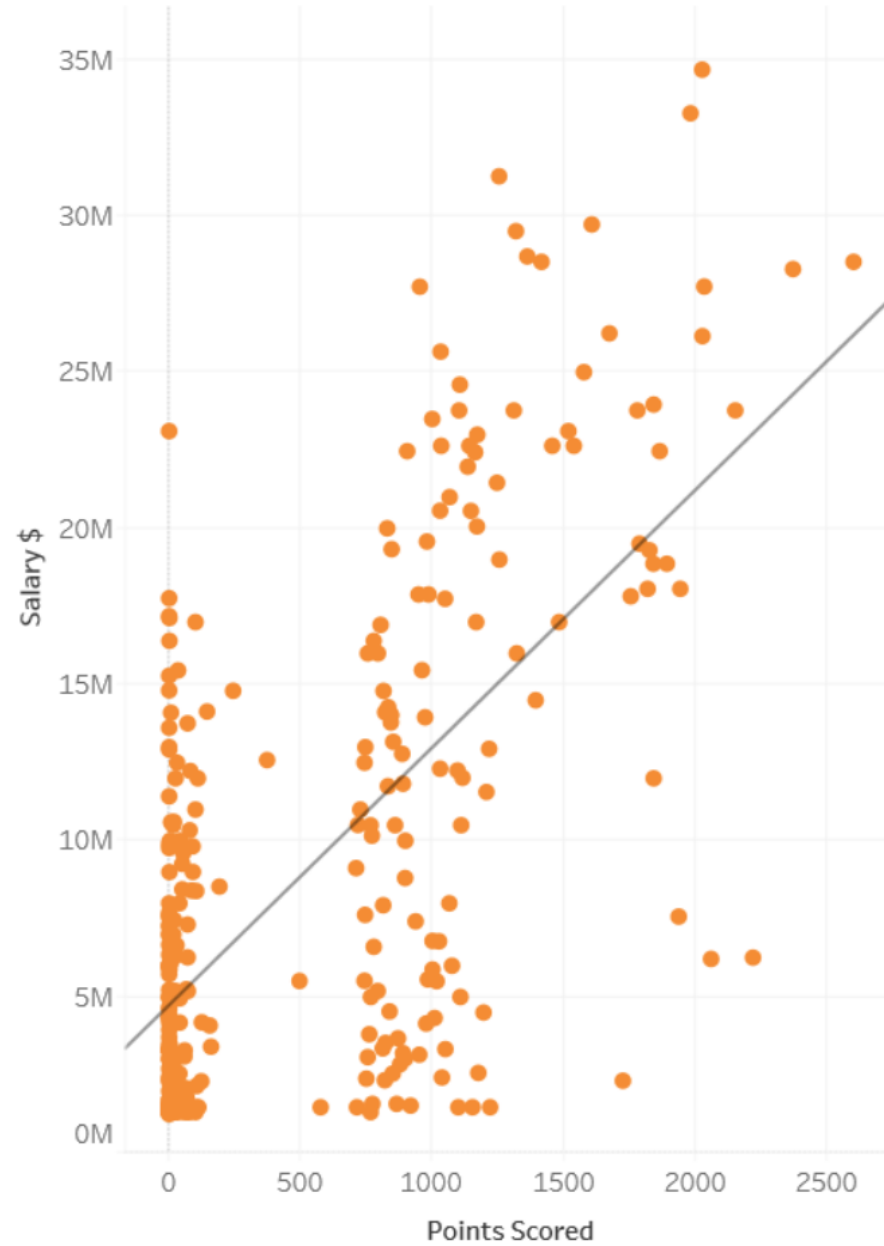
Relationship b/w Points and Salaries(NBA)



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Relationship b/w Points and Salaries(NBA)



Resources:

Number Talks for Secondary School

- ▶ https://docs.google.com/presentation/d/1I_zEnyFO-9BWZCeftIHnBDkZ2pa1ecD5ihqwnaAnBHo/edit#slide=id.g11e77be16ef_0_195
- ▶ <https://www.fawnnguyen.com/teach/tag/math+talks>
- ▶ <http://wodb.ca/numbers.html>
- ▶ <https://www.openmiddle.com/>
- ▶ <https://www.peterliljedahl.com/teachers/good-problem>
- ▶ <https://www.saravanderwerf.com/secondary-number-talks-ill-convince-you-with-ducks/>

Create/choose your own number talk

- ▶ Considering all the different number talks we looked at today, choose or create a number talk for your students
 - ▶ What are your key mathematical or discussion goals?
 - ▶ Are there multiple solutions?
 - ▶ Are there opportunities for all students to participate?

Questions?

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