

CTD is short for Connect The Dots which is where we choose a dot number (D) and a jump size (J) and lines connect the dots to create either a shape or a star.

| d  | j  | Shape / Star | D  | J  | Shape/Star |
|----|----|--------------|----|----|------------|
| 17 | 1  | Shape        | 13 | 1  | Shape      |
| 17 | 2  | Star         | 13 | 2  | Star       |
| 17 | 3  | Star         | 13 | 3  | Star       |
| 17 | 4  | Star         | 13 | 4  | Star       |
| 17 | 5  | Star         | 13 | 5  | Star       |
| 17 | 6  | Star         | 13 | 6  | Star       |
| 17 | 7  | Star         | 13 | 7  | Star       |
| 17 | 8  | Star         | 13 | 8  | Star       |
| 17 | 9  | Star         | 13 | 9  | Star       |
| 17 | 10 | Star         | 13 | 10 | Star       |
| 17 | 11 | Star         | 13 | 11 | Star       |
| 17 | 12 | Star         | 13 | 12 | Shape      |
| 17 | 13 | Star         | 13 | 13 | NONE       |
| 17 | 14 | Star         |    |    |            |
| 17 | 15 | Star         |    |    |            |
| 17 | 16 | Shape        |    |    |            |
| 17 | 17 | NONE         |    |    |            |

## Definitions List:

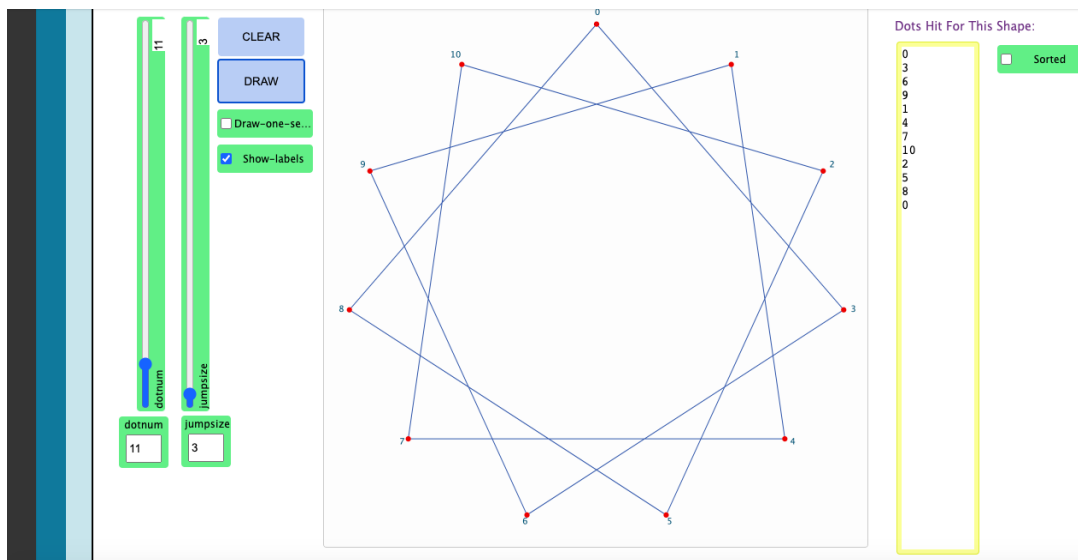
- **Star:** A Connect the Dots Figure with overlapping lines and acute outer angles.
- **Shape:** A closed Connect the Dots figure with no overlapping lines.
- **Dot number:** The number of dots that you connect using lines.
- **Jump size:** The number of dots that you skip over including the one you land on.

Simone's Prime Number conjecture: If D is a prime number then You will get all stars except for if J is 1 or one less than D.

When I was on netlogo (which is the site that we are using so that we do not have to do every CTD figure by hand.) I was just changing the D to different relatively small numbers and making the J every number from 1 to D. I started to see a pattern. Every prime number that had 1 and when J was one less than D it was always a shape, when D and J are the same number it is blank. I had a variation of my current conjecture

that was “ If D is an odd number then you will get all stars except for if J is 1 or one less than D” which was proven wrong By D=9 and D=15 because they are not prime numbers.

## HERE IS AN IMAGE OF NETLOGO



[HERE](#) is  
the link to  
my google  
sheet with  
the data.

One of my other conjectures was “When the dot number is over ten and the jump size is ten less that the dot size it will create a shape” but I proved that wrong with  $d=54$ ,  $j=44$  because it created a star. I suppose I could have said “When the dot number is over ten and the jump size is ten less that the dot size and is a multiple of 10 it will create a shape.”