

Session One

Conceptualizing and Representing Linear Relationships

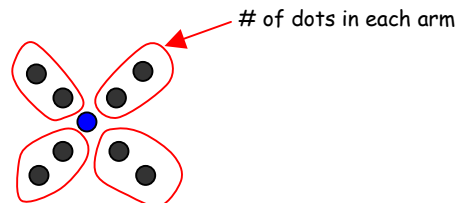
Solution Methods: Growing Dots 1

t = number of minutes
 n = number of arms

Closed/Explicit Methods

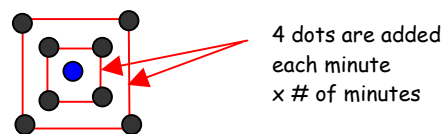
1. Arms + center: $t4 + 1 \implies$ Generalized form: $tn + 1$

Total includes the number of dots in each arm
 \times the number of arms and add the beginning dot.



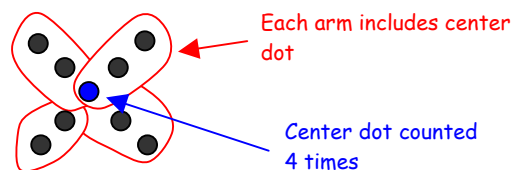
2. Groups of 4 + center: $4t + 1 \implies$ Generalized form: $nt + 1$

Total includes the number of dots added for each minute
 \times the number of minutes + the beginning dot.



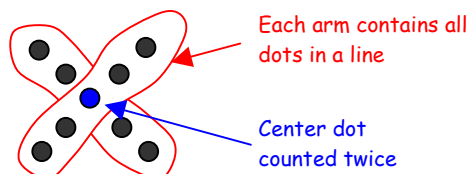
3. Extended arms: $(t + 1)4 - 3 \implies$ Generalized form: $(t + 1)n - 3$

Total includes the number of dots in each arm \times
the number of arms.
The center (beginning) dot is counted 4 times,
so 3 must be subtracted (excluded) from the total.



4. Crossed arms: $2(2t + 1) - 1$

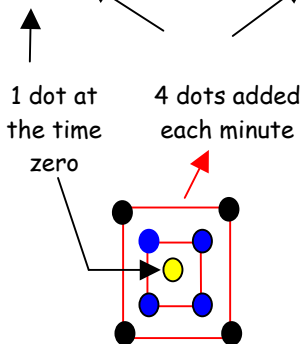
An arm is defined as all the dots in a line.
The center dot is counted twice, so 1 must be
subtracted (excluded) from the total.
(Note: this method doesn't generalize for all configurations.)



Recursive Method

1. Beginning with one dot, four new dots are added each minute. Number of dots at time 0 plus the number of dots added each minute times the number of minutes (t).

$$1 + (4 + 4 + 4 + \dots + 4 + 4) \implies f(t+1) = f(t) + 4; f_{\text{initial}} = 1 \implies f(t+1) = 1 + (t) \cdot 4$$



Recursive equation

Closed form growing
from recursive