

Unit 3: Solving Equations and Systems of Equations



Activity 3.1 - Stage Setup I

There are many different kinds of microphones. Choosing the right one depends mostly on what and where are you recording. If you want to record a sound coming from one direction and block out sounds from all other directions, then you might want to use a unidirectional microphone. These microphones clearly record what's right in front of it and ignores the stuff that's not in front of it.

Let's help set up the stage for a Hawaiian Choir of nine singers. On the y-axis are our three unidirectional microphones at the following points.

Mic A: (0, 4)

Mic B: (0, 8)

Mic C: (0, 13)

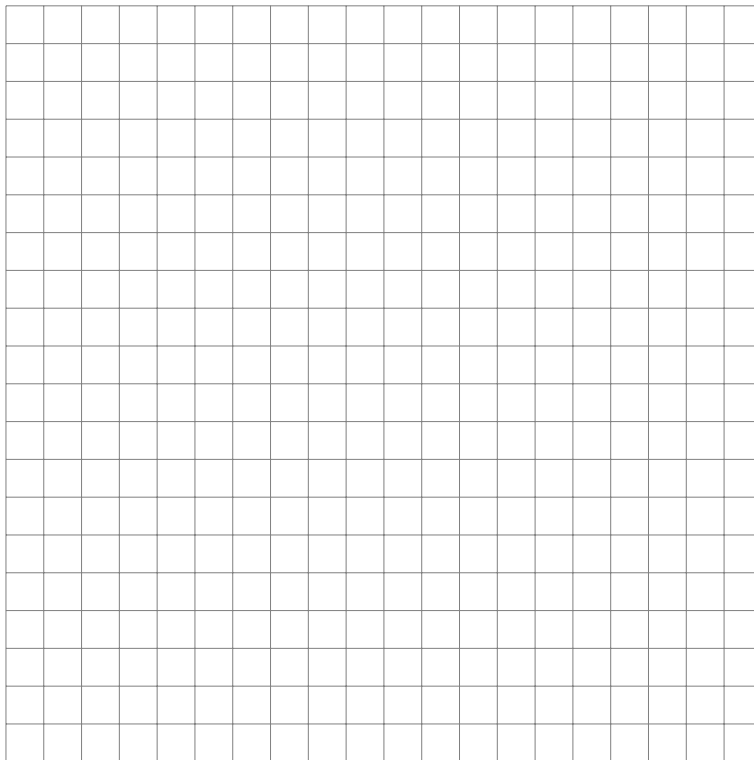
The Hawaiian Choir is split into three groups of three at the following points.

Group 1: (7, 4)

Group 2: (5, 8)

Group 3: (6, 12)

1. Plot these six points on a graph.



2.a. Microphone A is pointed directly at Group 1. Draw a line connecting these two points. What is the equation of the line that goes through these two points? (Use the point slope form: $y = mx + b$).

b. Microphone B is pointed directly at Group 3. Draw a line connecting these two points. What is the equation of the line that goes through these two points? (Use the point slope form: $y = mx + b$).

c. Microphone C is pointed directly at Group 2. Draw a line connecting these two points. What is the equation of the line that goes through these two points? (Use the point slope form: $y = mx + b$).

3. Solo! One of the singers has to perform a solo.

a. Where could they stand in order for microphones A and C to record them clearly? Use your answers from Part 2, and the substitution method.

b. Where could the soloist stand in order for microphones B and C to record them clearly? Use your answers from Part 2, and the elimination method.

c. Does it make more sense to stand at the point from Part 3a or from Part 3b? Why?

Activity 3.2 - Stage Setup II

Suppose that you set up four unidirectional microphones along the y-axis. The microphones are pointed left along the lines given by the following equations.

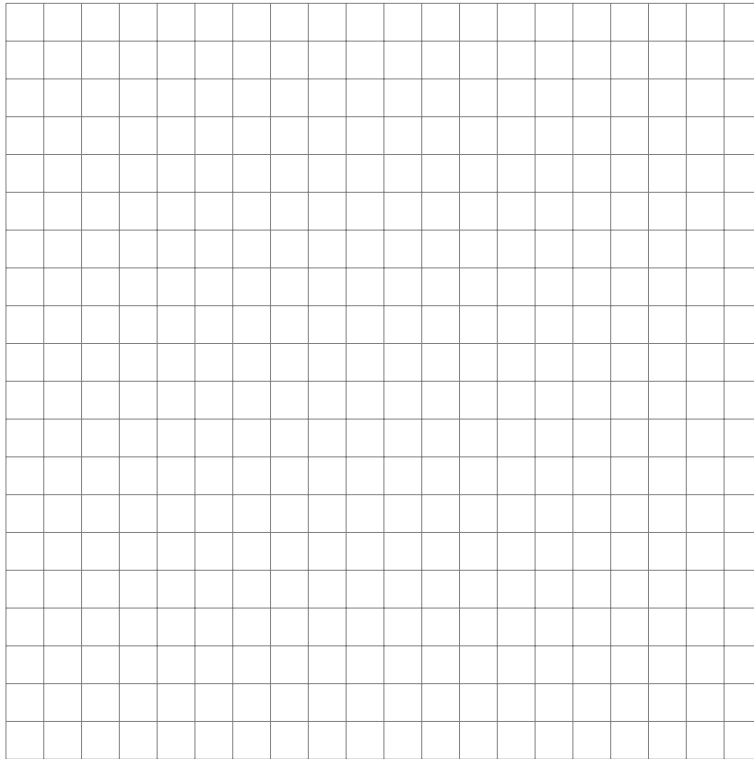
Mic A: $y = -2 + (2/3)x$

Mic B: $y = 2$

Mic C: $y = 6 + (2/3)x$

Mic D: $y = 8$

1. Graph the four equations for the mic directions. Label where the microphones are on the y-axis.



2. The soloist should stand where two microphones intersect. What is the coordinate where the soloist should stand? There is more than one possible answer, why did you choose to put the soloist here?

3. The backup singers should also stand where two microphones intersect, but away from the soloist. What are the coordinates where they should stand? There is more than one possible answer, why did you choose to put the backup singers here?

4. There is a 'ukulele player standing at $(3, 5)$. You have to set up one more microphone on the y -axis for their 'ukulele. This microphone is specially set up to record the sounds of a 'ukulele but microphones B and D are set up to record voices. What is the equation of the line that goes from the microphone to 'ukulele, but NEVER intersects microphones B or D?