**Hey! Wait Up! -Modeling Systems of Linear Equations**

**Directions:**

In this activity you will be using the Vernier CBR2 Motion Detectors. You will need to be in groups of four: 2 people will be the walkers, 1 person will start the motion detector and operate the stopwatch, and 1 person will mark the point where the walkers intersect. You will be doing this 4 times so that everyone in the group has a chance to partake in these positions.

You will need a meter stick so that you can measure the distance from the CBR2 to the walkers’ assigned starting points, as well as to measure the distance of their intersection point to the CBR2. You will use a stopwatch to mark the time that the walkers’ intersected.

Read through the instructions for each walking activity carefully before starting. You will then do the walking activity. Examine calculator results to make sure that the lines appear to be linear. (If you are unsure, please ask the teacher.) If they are not, reset and repeat the walking activity. If they are, collect and record the data (time of intersection and distance of intersection point to CBR2). Intersection happens the moment the two walkers are shoulder to shoulder, the marker must note the position on the floor, while the timer stops the stopwatch.

You will then examine the calculator data to find the intersection time and distance using the Graphical Trace function as well as through the Calculator Intercept Search.

**Walk 1**

**Instructions:**

Walker 1 stands about two meters from the first detector, and prepares to walk directly toward that detector at a normal walking pace.

Walker 2 stands about half a meter from the second detector, and prepares to walk directly away from that detector at a normal walking pace.

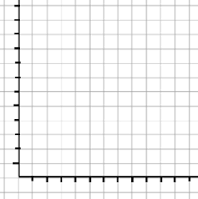
|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct Measure | Graphical Trace | Calculator Intercept Search |
| Intersection  Time  (x-coordinate) |  |  |  |
| Intersection  Distance  (y-coordinate) |  |  |  |

Using the Trace function on the calculator find (x1,y1) and (x2,y2) for

Walker 1 and Walker 2. Then find the slope and intercept by hand.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (x1,y1) | (x2,y2) | slope | intercept |
| Walker 1 |  |  |  |  |
| Walker 2 |  |  |  |  |

State the System of Linear Equations, sketch it, and solve below:



Does your solution match what

you found above? Why/ Why not?

**Walk 2**

**Instructions:**

Walker 1 stands about four meters from the first detector, and prepares to walk directly toward that detector at a normal walking pace.

Walker 2 stands about six meters from the second detector, and prepares to walk directly toward that detector at a brisk walking pace.

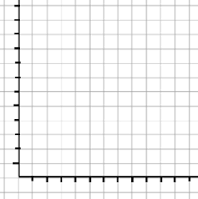
|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct Measure | Graphical Trace | Calculator Intercept Search |
| Intersection  Time |  |  |  |
| Intersection  Distance |  |  |  |

Using the Trace function on the calculator find (x1,y1) and (x2,y2) for

Walker 1 and Walker 2. Then find the slope and intercept by hand.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (x1,y1) | (x2,y2) | slope | intercept |
| Walker 1 |  |  |  |  |
| Walker 2 |  |  |  |  |

State the System of Linear Equations, sketch it, and solve below:



Does your solution match what

you found above? Why/ Why not?

**Walk 3**

**Instructions:**

Walker 1 stands about six meters from the first detector, and prepares to walk directly toward that detector at a normal walking pace.

Walker 2 stands about six meters from the second detector, and prepares to walk directly toward that detector at a brisk walking pace.

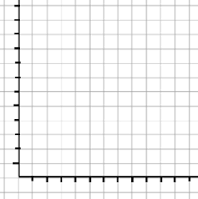
|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct Measure | Graphical Trace | Calculator Intercept Search |
| Intersection  Time |  |  |  |
| Intersection  Distance |  |  |  |

Using the Trace function on the calculator find (x1,y1) and (x2,y2) for

Walker 1 and Walker 2. Then find the slope and intercept by hand.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (x1,y1) | (x2,y2) | slope | intercept |
| Walker 1 |  |  |  |  |
| Walker 2 |  |  |  |  |

State the System of Linear Equations, sketch it, and solve below:



Does your solution match what

you found above? Why/ Why not?

**Walk 4**

**Instructions:**

Walker 1 stands about one meter from the first detector, and prepares to walk directly away from that detector at a slow walking pace.

Walker 2 stands about half a meter from the second detector, and prepares to walk directly away from that detector at a normal walking pace.

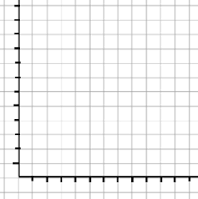
|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct Measure | Graphical Trace | Calculator Intercept Search |
| Intersection  Time |  |  |  |
| Intersection  Distance |  |  |  |

Using the Trace function on the calculator find (x1,y1) and (x2,y2) for

Walker 1 and Walker 2. Then find the slope and intercept by hand.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (x1,y1) | (x2,y2) | slope | intercept |
| Walker 1 |  |  |  |  |
| Walker 2 |  |  |  |  |

State the System of Linear Equations, sketch it, and solve below:



Does your solution match what

you found above? Why/ Why not?

**Exit Slip**

In your own words, what is a system of linear equations?

Give me an example of a real world situation (that does not involve walking/ running) that you could model using a system of linear equations.