

## Bivariate Data and Systems

### IS IT HOT IN HERE OR IS IT ME?

The weather at places around the world changes daily, sometimes hourly. The average temperature over a period of several years is used to study weather trends. The average temperatures for two cities, one in the northern hemisphere and one in the southern, are shown below.

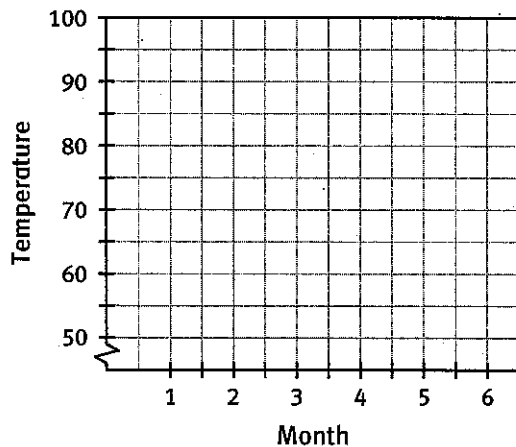
#### Guaymas, MX

Month	1	2	3	4	5	6
Temp °F	64	66	68	75	79	87

#### Johannesburg, SA

Month	1	2	3	4	5	6
Temp °F	69	68	66	61	57	51

- Plot the data from both cities on the grid below. Use dots for Guaymas and triangles for Johannesburg.



#### MATH TIP

The jagged part of the vertical axis means that the lower values are not included because there are no points with  $y$ -coordinates that are these lower values.

- Describe the associations for each city.
- Draw a trend line for each set of data.
- Find the equations of the trend lines for both cities.
- Explain what the  $y$ -intercept means for each line in this context.
- Explain what the slope of each line represents in this context.
- Determine the month in which the temperatures of both cities are the same.
- Solve the following system of equations algebraically.

$$\begin{cases} y = 3x - 2 \\ y = 5x - 8 \end{cases}$$

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9. Solve the following system of equations graphically.

$$y = -3$$

$$x = 5$$

	<b>Exemplary</b>	<b>Proficient</b>	<b>Emerging</b>
<b>Math Knowledge</b> #2, 4, 7, 8, 9	<ul style="list-style-type: none"> <li>• Correctly identifies associations of data on the graph (2)</li> <li>• Correctly determines both equations of trend lines (4)</li> <li>• Correctly identifies the month when temperatures are the same (7)</li> <li>• Correctly solves the system of equations (8)</li> <li>• Correctly solves the system of equations graphically (9)</li> </ul>	<ul style="list-style-type: none"> <li>• Can only identify one of the two associations on the graph</li> <li>• Determines the correct equation for one of the trend lines</li> <li>• Identifies the common temperature but not the month</li> <li>• Identifies only one coordinate of the solution to the system</li> <li>• Graphs the equations but does not provide the correct solution</li> </ul>	<ul style="list-style-type: none"> <li>• Is unable to identify the associations present in the graph</li> <li>• Is unable to determine the equation of either line</li> <li>• Does not identify the common temperature or the month</li> <li>• Is unable to provide a solution to the system</li> <li>• Does not graph the equations</li> </ul>
<b>Problem Solving</b> #2, 8	<ul style="list-style-type: none"> <li>• Correctly interprets data on a graph to describe both associations (2)</li> <li>• Correctly uses an appropriate method to solve the system of equations (8)</li> </ul>	Solves one of the two items correctly and completely	Is unable to solve either of the two problems correctly
<b>Representation</b> #1, 3, 9	<ul style="list-style-type: none"> <li>• Creates representation of data (1)</li> <li>• Correctly represents associations with trend lines (3)</li> <li>• Correctly graphs the system of linear equations and determines the correct solution (9)</li> </ul>	Provides appropriate representations for two of the three problems	Provides one of the required representations
<b>Communication</b> #2, 5, 6	<ul style="list-style-type: none"> <li>• Correctly describes association of data plotted on the graph (2)</li> <li>• Correctly explains the meaning of the y-intercept for both trend lines (5)</li> <li>• Correctly explains the meaning of the slope for both of the trend lines (6)</li> </ul>	Clearly communicates an explanation for two of the three items	Clearly communicates an explanation for only one of the items