

Distance Formula with Ari

Answer Key

Name: _____

Date: _____

Vocabulary

Cartesian Plane - A flat grid with horizontal (x-axis) and vertical (y-axis) lines to locate and plot points.

Activity 1

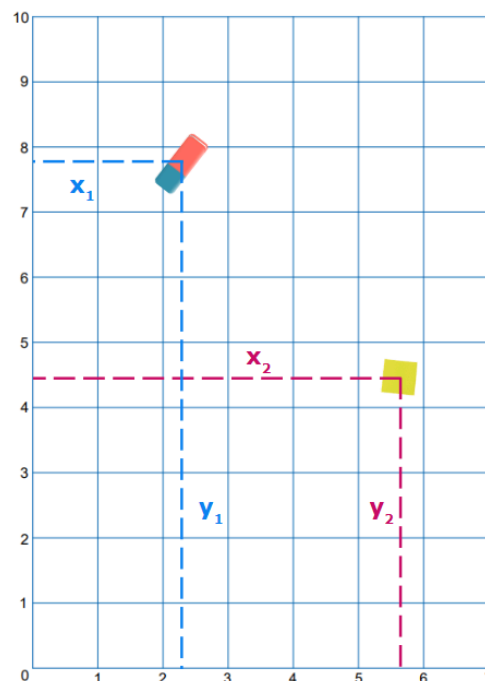
For this activity, you will use Ari's distance sensor to calculate the **x and y coordinates** of two small objects. You will then use the distance formula to calculate the distance between the objects.

- ☐ Find two small objects that are roughly the size of an eraser or smaller. Alternatively, you can use objects provided by your teacher.
- ☐ Place the two objects in random locations on the 1-inch Grid paper.
- ☐ Use Ari to measure the **x and y coordinates** of both objects and record them in the table below.

Note: Student answers will vary. This is an example.

Object	x	y
Eraser	2.3 in	7.8 in
Math tile	5.6 in	4.5 in

- ☐ Use the distance formula to calculate the distance of the two objects based on the x and y coordinates you measured. Record the value below.



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Calculated distance = 4.7 in

Distance Formula with Ari

Name: _____

Answer Key

Date: _____

Activity 2

For the second activity, you will use Ari's distance sensor to find the distance between the two objects and compare it to the calculated distance from Activity 1.

- ☐ With the two objects in the same location as in Activity 1, use Ari to obtain the distance between the two objects. You may need to use a flat surface, like a notebook, to help you measure the distance.

- ☐ Record the distance below.

Distance = 4.5 in

- ☐ Your **distance** might be different from your **calculated distance**. If that is the case, record the difference between the two values below.

Difference in values = 4.7 in - 4.5 in = 0.2 in

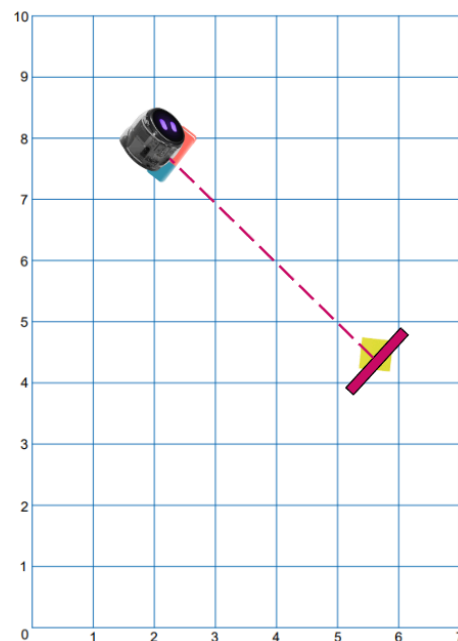
- ☐ The percent error formula is shown below. Use the formula to calculate the percent error between the distance and calculated distance. You can choose either value as the "**true**" value, but you should be able to explain why you chose it.

 **Percentage Error**

$$\left| \frac{\text{Measured} - \text{True}}{\text{True}} \right| \times 100 = (0.2 / 4.5) \times 100 = 4.4 \%$$

- ☐ Explain which value you chose to use as the "**true**" value and why.

I chose to use 4.5 as the **true** value because there are more chances to make a mistake while measuring x and y coordinates for 2 objects (4 measurements total) than there are for the distance (1 measurement total).



Distance Formula with Ari

Answer Key

Name: _____

Date: _____

Exit Ticket

Please answer the following prompts.

Do not forget to include your **name** and **date** on this paper!

1. A gardener is building a wooden fence in their backyard. They want to enclose a portion of the fence to plant a small garden, denoted by the dashed line.

How many feet of wood do they need to build the dashed part of the fence?

Bottom left point is (0, 0)

Top right point is (6, 8)

Using the distance formula, the distance is:

$$\begin{aligned} &\sqrt{(6 - 0)^2 + (8 - 0)^2} \\ &\sqrt{(6)^2 + (8)^2} \\ &\sqrt{36 + 64} \\ &\sqrt{100} = 10 \end{aligned}$$



2. A regulation soccer goal post has a width of 7.32 meters. A student uses measuring tape to find the width of a goal post to be 7.24 meters.

Calculate the percent error.

$$\begin{aligned} \% \text{ error} &= \left| \frac{E - T}{T} \right| \times 100 \\ \% \text{ error} &= \left| \frac{7.24 - 7.32}{7.32} \right| \times 100 \\ \% \text{ error} &= \left| \frac{-0.08}{7.32} \right| \times 100\% \\ \% \text{ error} &= 1.09 \end{aligned}$$

