

Pythagorean Theorem with Ari:

Name: _____

Answer Key

Date: _____

Vocabulary

Right Triangle - A triangle with two perpendicular sides that form a 90-degree angle, also called a right angle.

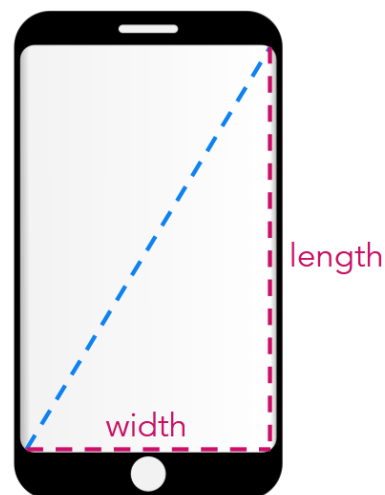
Perpendicular - Two lines that cross to make a 90-degree angle.

Activity 1

Did you know that the Pythagorean Theorem is used to calculate the size of TV and phone screens? Whenever you see the screen size listed for a product, like 55 inches, that distance actually measures from one corner to the opposite.

For this activity, you will use Ari's distance sensor to find the length and width of at least 3 objects. Afterward, you will use the Pythagorean Theorem to calculate the diagonal distance between the corners of the object.

- ☐ Find three objects that you will measure using Ari. Some possible objects are projector screens, textbooks, computer screens, doors, windows, desks, cabinets, etc.
- ☐ Record the three objects in the table below.
- ☐ Use Ari's distance app to measure the length and width of each object. Record your measurements in the table.
- ☐ Use the Pythagorean Theorem to calculate the diagonal distance of each object and record your answer in the table.



Pythagorean Theorem: $a^2 + b^2 = c^2$

Object	Length	Width	Diagonal
Phone	15 cm	7 cm	16.6 cm
Desk	24 cm	47 cm	52.3 cm
Notebook	30 cm	22 cm	37.2 cm

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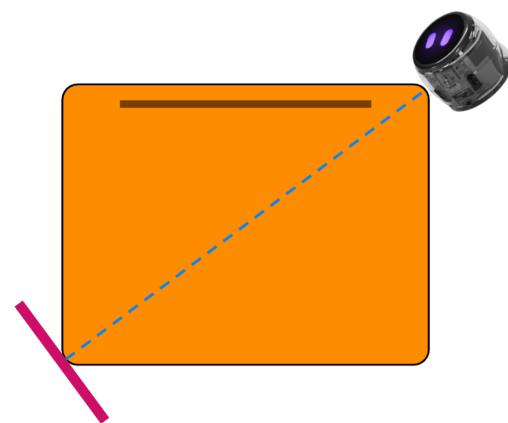
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Activity 2

For the second activity, you will use Ari's distance sensor to measure the diagonal distance of each object from Activity 1 and compare that to the value you calculated using the Pythagorean Theorem.

Object	Calculated Distance (copy from Activity 1)	Measured Distance (using Ari)	Difference (calculated - measured)
Phone	16.6 cm	16.2 cm	0.4 cm
Desk	52.3 cm	51.5 cm	0.8 cm
Notebook	37.2 cm	37 cm	0.2 cm

- ☐ Copy the **calculated distance** you found in Activity 1 into the table above.
- ☐ Use Ari to measure the distance from one corner to the other. You will need a flat surface on the other end in order to measure the distance.
- ☐ Record the **measured distance** in the table above. Repeat for each of your objects.
- ☐ Find the **difference** between the calculated and measured distances. Record the value in the table above.
- ☐ Are your **calculated** and **measured** distances different? If so, provide a reason as to why the values might differ.



The values might differ because of inconsistent measurements or rounding errors.

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Exit Ticket

Please answer the following prompts.

Remember to include your **name** and **date** on this paper!

1. The Pythagorean Theorem is $a^2 + b^2 = c^2$. Solve the Pythagorean Theorem for a .

$$\begin{array}{r} a^2 + b^2 = c^2 \\ - b^2 = - b^2 \\ \hline a^2 = c^2 - b^2 \end{array}$$

$$\sqrt{a^2} = \sqrt{c^2 - b^2}$$

$$a = \sqrt{c^2 - b^2}$$

2. Ollie wants to figure out the area of the green triangle. He knows that the area of a triangle is $\frac{1}{2} (base \times height)$. Show Ollie how to calculate the area of the green triangle.

$$a = \sqrt{c^2 - b^2}$$

$$a = \sqrt{15^2 - 9^2}$$

$$a = \sqrt{225 - 81}$$

$$a = \sqrt{144}$$

$$a = 12 \text{ mm}$$

$$\text{area} = \frac{1}{2} (base \times height)$$

$$\text{area} = \frac{1}{2} (9 \text{ mm} \times 12 \text{ mm})$$

$$\text{area} = \frac{1}{2} (108 \text{ mm}^2)$$

$$\text{area} = 54 \text{ mm}^2$$

