

Name: _____

Date _____

Cohort _____

Pythagorean Theorem Water Source Map Rubric

	4 Points	3 Points	2 Points	1 Points
Pythagorean Theorem	<input type="checkbox"/> I met all the 3 Points criteria. <input type="checkbox"/> I checked my work and verified my answer makes sense by plugging it back in.	<input type="checkbox"/> I included the pythagorean theorem formula <input type="checkbox"/> I showed my work for each step of the pythagorean theorem <input type="checkbox"/> I correctly solved for the distance between ASCEND and _____.	Met 2 of the criteria.	Met 1 or none of the criteria.
Scientific Notation	<input type="checkbox"/> I met all the 3 Points criteria. <input type="checkbox"/> Converts answer to an appropriate unit of measurement.	<input type="checkbox"/> Uses scale to find the actual distance <input type="checkbox"/> Answer is in scientific notation <input type="checkbox"/> Uses the correct units of measurement	Met 2 of the criteria.	Met 1 or none of the criteria.
Written Description	<input type="checkbox"/> I met all 3 points writing criteria. <input type="checkbox"/> Makes a connection between concepts we have learned in class and the distance between ASCEND and bodies of water.	<input type="checkbox"/> Clearly introduces the project and location. <input type="checkbox"/> Explains how the pythagorean theorem can be used to find the distance between two locations. <input type="checkbox"/> Uses mathematical vocabulary to explain your work	Met 2 of the writing criteria.	Met 1 or no writing criteria.
Craftsmanship	<input type="checkbox"/> I met all the 3 point craftsmanship criteria <input type="checkbox"/> I color coded my work	<input type="checkbox"/> Work is neat and easy to follow <input type="checkbox"/> Includes title and labels <input type="checkbox"/> Right triangle is clear and sides are labeled	Met 2 of the craftsmanship criteria	Met 1 or no craftsmanship criteria

Total Points: / 16

Written description Guiding Questions

Introduce location:

- Where did you visit?
- What did I see / what is there to do at that location?

Introduce the Project:

- What is the purpose of this assignment?
- How did you use what you learned in class to find the distance between the location(s)?

Math Concepts:

- What is the pythagorean theorem and when can we use it?
- Why does the formula work?
- What is scientific notation and when do we use it?
- Why/how did you convert between units?

Importance:

- How does the distance between two locations affect accessibility to those locations?
- Why does the distance between locations matter?
- Why is the pythagorean theorem important? Why is scientific notation important?
- Where else can we use these mathematical concepts

Over the Ocean PIER 14

RESTAURANT • LOUNGE • FISHING PIER



Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

$$10^2 + 60^2 = c^2$$

$$100 + 3600 = c^2$$

$$c = 3700$$

$$c \sim 60.8$$

The reason we do pythagorean theorem is because we need to find the side length that isn't given to us. By using the formula, we are able to solve for the unknown length of a right triangle.

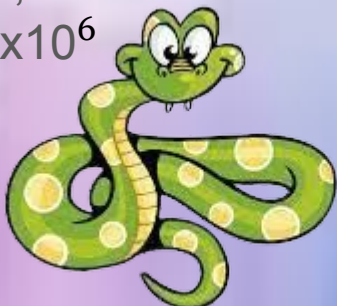


We Try to convert our answer into scientific notation so that we can later divide that number by to measurement we are doing which is kilometers

$$C \sim 60.8 \times 25,000$$

$$C \sim 1,520,000$$

$$C \sim 1.52 \times 10^6$$



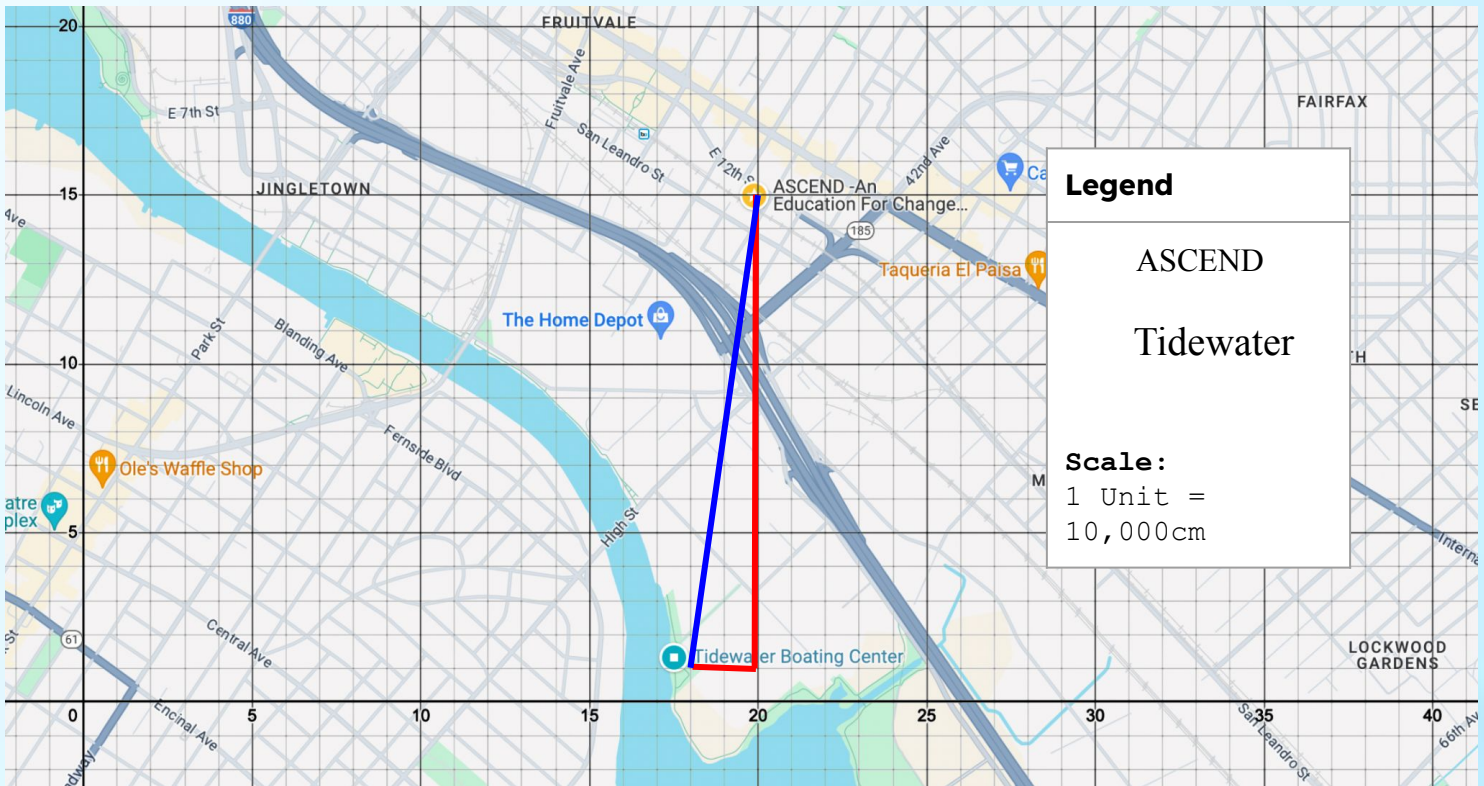
$$\frac{1.52 \times 10^6}{1 \times 10^5}$$

$$1 \times 10^5$$



The reason why we are dividing by 1×10^5 is because we need to change the measurement unit to kilometers in this case it's centimeters so if we divide by number that is in Km then we can get our answer as a kilometer which is 15.2Km

Solved by:
Dilan Medina Muratalla
(Mr President)



1. Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

$$14^2 + 2^2 = c^2$$

$$196 + 4 = c^2$$

$$200 = c^2$$

$$\sqrt{200} = \sqrt{c^2}$$

$$c \sim 14.142$$

Pythagorean theorem is an equation we use when we have a right triangle and a missing side length.

2. Scale Factor: 1 unit = 10,000 cm

$$c \sim 14.142 \times 10,000 \text{ cm}$$

$$c \sim 141420 \text{ cm}$$

We multiplied 14.142 because each unit on our map was 10,000 cm so in order to get an accurate answer we have to multiply 14.142 x 10,000

3. Scientific notation:

$$c \sim 1.41 \times 10^5 \text{ cm}$$

We use scientific notation because it's easier to write big numbers. For example, we write 1.41×10^5 instead of 1.41420.

4 Converting units:

$$1 \text{ km} = 100,000 \text{ cm}$$

$$= 1 \times 10^5 \text{ cm}$$

$$c \sim 1.4142 \times 10^5 \text{ cm}$$

$$\frac{1.4142 \times 10^5 \text{ cm}}{1 \times 10^5 \text{ cm}}$$

$$c \sim 1.4142 \times 10^5 \text{ km}$$

$$c \sim 1.142 \text{ km}$$

Centimeters aren't an appropriate unit of measurement, since it is used to measure small things. So we convert our unit of measurement to kilometers. That's why we do 1.4142×10^5 which is 100,000.

Tidewater is 1.4142 km away from Ascend.

1. Pythagorean Theorem:



$$a^2 + b^2 = c^2$$

$$29^2 + 26^2 = c^2$$

$$841 + 676 = c^2$$

$$1576 = c^2$$

$$\sqrt{1576} = \sqrt{c^2}$$

$$c \sim 39.70$$

The Pythagorean Theorem is an equation that we can use to solve for the length of the missing side in a right triangle. The equation is $a^2 + b^2 = c^2$ and all we need to do is plug in our values. A and B are known to be the "legs" in a right triangle and C is the hypotenuse, which is the longest side of a triangle and that is what we are looking for. We are finding the side length of C.

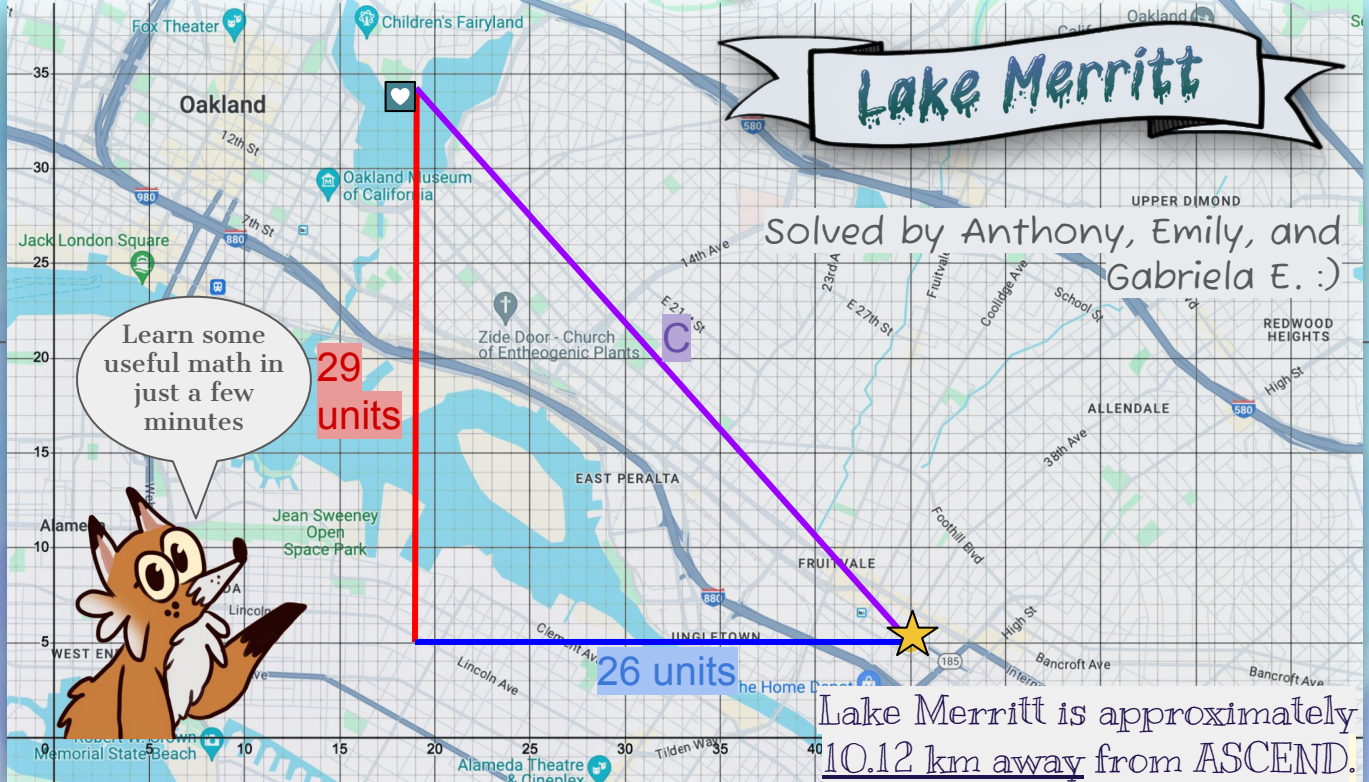
2. Scale Factor: 1 unit = 25,500 cm



$$c \sim 39.70 \times 25,500 \text{ cm}$$

$$c \sim 1,012,350 \text{ cm}$$

We multiplied 39.70 by 25,500 cm long because 1 unit in the map is 25,500 cm and we needed to do 39.70 x 25,500 in order to get the accurate distance. We then ended up getting 1,012,350



3. Scientific notation:

$$c \sim 1.012 \times 10^6 \text{ cm}$$

Scientific notation is when very small and very big numbers are written in a form that is more eligible. In our case, we needed to convert 1,012,350 into scientific notation form. We then turned 1,012,350 into 1.012, since numbers in scientific notation need to be greater than 1 and less than 10. Then, we added 10^6 since 1,000,000 is equal to it. That's how we formed our new equation.



★ Legend ★

★ ASCEND

♥ Lake Merritt

Scale:
1 Unit = 25,500cm

4. Converting units:

$$1 \text{ km} = 100,000 \text{ cm}$$

$$= 1 \times 10^5 \text{ cm}$$

$$c \sim 1.012 \times 10^6 \text{ cm}$$

$$1 \times 10^5 \text{ cm}$$

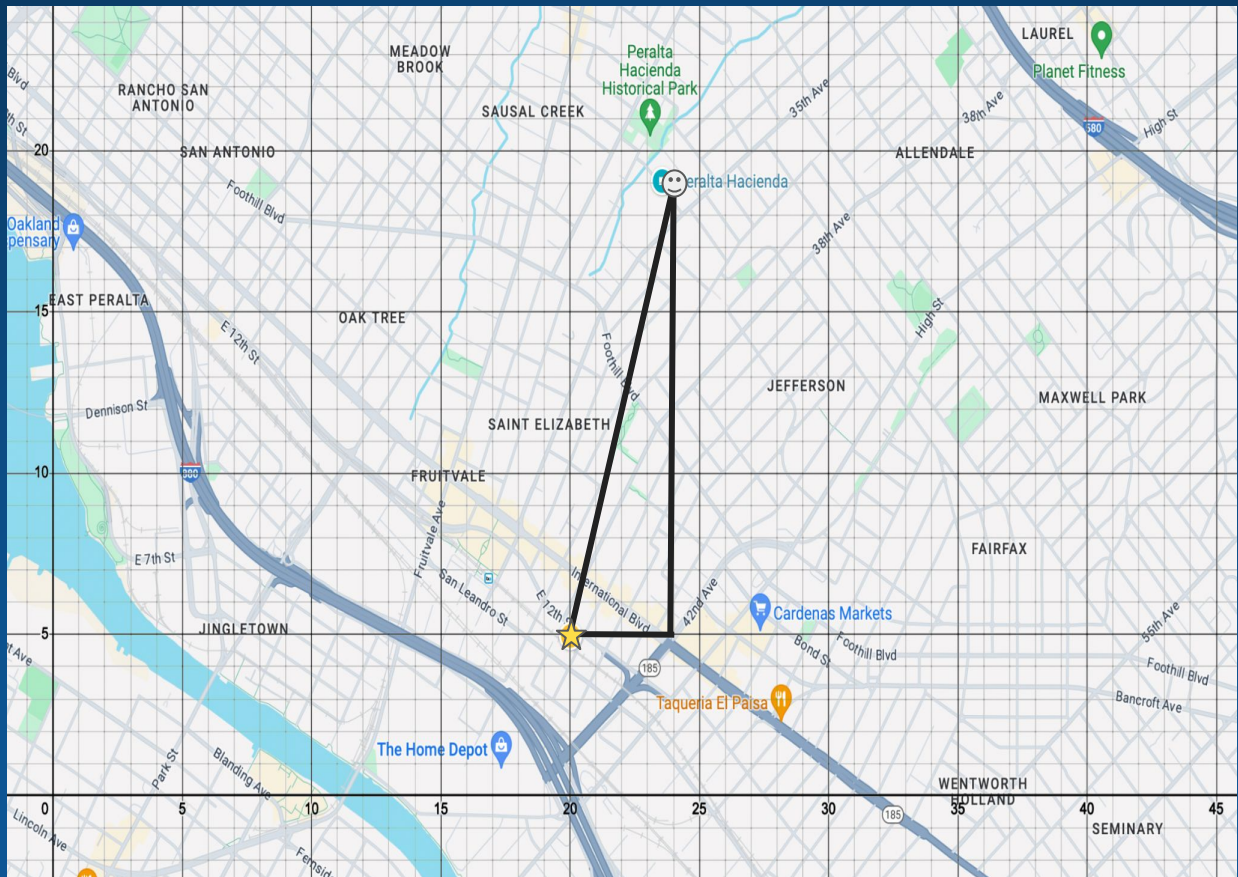
$$c \sim 1.012 \times 10^1 \text{ km}$$

$$c \sim 10.12 \text{ km}$$



Since centimeters are a small unit of measurement, we needed to find another way to write our final answer. We had to divide to convert centimeters into kilometers, a more simple unit of measurement to read. We first converted 100,000 to 1×10^5 to make it easier to write our equation. 100,000 cm is equal to 1 km. We then divided 1.012×10^6 (our number in cm) by 1×10^5 (the amount of cm in 1 km), which gave us 1.012×10^1 which, in simple terms, is equal to 10.12 km. So our final answer is that ASCEND is 10.12 km away from Lake Merritt.

Peralta Hacienda



★ = Ascend
 😊 = Peralta

1 unit = 10,000 cm

Pythagorean Theorem

Converting units

$$a^2 + b^2 = c^2$$

$$14^2 + 4^2 = c^2$$

$$196 + 16 = c^2$$

$$212 = c^2$$

$$\sqrt{212} = \sqrt{c^2}$$

$$c \sim 14.5$$

We calculated the distance between Ascend and Peralta Hacienda. In math class we learned how to use pythagorean theorem, convert units and write numbers in scientific notations.

$$1 \text{ km} = 100,000 \text{ cm}$$

$$= 1.45 \times 10^5 \text{ cm}$$

$$c \sim \frac{1.45 \times 10^5 \text{ cm}}{1 \times 10^5 \text{ cm}}$$

$$c \sim 1.45 \times 10^5 \text{ km}$$

$$c \sim 1.45 \text{ km}$$

Scientific Notation

$$1 \text{ unit} = 10,000 \text{ cm}$$

$$c \sim 14.5 \times 10,000 \text{ cm}$$

$$c \sim 145,000 \text{ cm}$$

$$c \sim 1.45 \times 10^5 \text{ cm}$$

The distance between ASCEND and Peralta Hacienda is 1.45 km

Solved by
 Xavier, Gabriel & Brian

Pier 39 is approximately
16.97 km away from Ascend

Pier 39

1 Unit = 25,000 cm



① Pythagorean Theorem (P.T):

$$a^2 + b^2 = c^2$$

$$66^2 + 16^2 = c^2$$

$$4356 + 256 = c^2$$

$$4612 = c^2$$

$$\sqrt{4612} = \sqrt{c^2}$$

$$c \sim 67.91$$

Key

★ = Ascend

● = Pier 39



② Scale Factor:

$$c \sim 67.91 \times 25,000 \text{ cm}$$

$$c \sim 1,697,750 \text{ cm}$$

③ Scientific notation:

$$c \sim 1.697 \times 10^6 \text{ cm}$$

④ Converting units:

$$1 \text{ km} = 100,000 \text{ cm}$$

$$= 1 \times 10^5 \text{ cm}$$

$$c \sim \frac{1.697 \times 10^6 \text{ cm}}{1 \times 10^5 \text{ cm}}$$

$$c \sim 1.697 \times 10^1 \text{ km}$$

$$c \sim 16.97 \text{ km}$$

Description :

We went to Pier 39 in San Francisco. In this project we were trying to find the distance between two points in km. P.T is a formula you can use when you are trying to find the distance between two locations (Ascend and Pier 39). P.T connects to the distance of Ascend and the Pier because P.T helps you find the distance.

Legend

Pier 49



Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

$$69^2 + 7^2 = c^2$$

$$4761 + 49 = c^2$$

$$4775 = c^2$$

$$\sqrt{4775} = \sqrt{c^2}$$

**Solved by Elias G,
Mauricio and
Johana**

Scientific Notation

$$c \sim 69.1013 \times 10^4 \text{ cm} \times 2.5 \times 10^4 \\ = 69.1014 \text{ cm} \times 2.5 \times 10^4$$

We used the pythagorean theorem to approximate the Distance between 2 locations By creating a \triangle like above then connecting both locations diagonally, then measure the units in the right lines called legs (blue and purple) then multiply them by themselves, add the result, square root it, then multiply the number by the measurement of units(right) and finally the result.

Mathematicians use mm,cm,m and km because these units of measurements are more accurate than using miles or inches. Hope you learned something new.

Converting Units

$$1,000,000\text{mm}=100,000 \text{ cm}=1,000\text{m}=1\text{Km}$$

$$c \sim 69.1014\text{cm} \times 2.5 \times 10^4 \\ = 1,727,535\text{cm} = 1,728\text{cm}$$

$$\frac{1,728 \times 10^6}{1 \times 10^5} = 1,728 \times 10 \\ C \sim 17,28 \text{ Km}$$

**Ascend is 17.28 Km
away from Pier 49**

ALAMEDA BEACH

Solved by jaslene



1. Pythagorean theorem

$$a^2 + b^2 = c^2$$

$$21^2 + 26^2 = c^2$$

$$441 + 676 = c^2$$

$$1117 = c^2$$

$$\sqrt{1117} = \sqrt{c^2}$$

$$c \sim 33.421$$

The distance between Alameda beach and ascend is 3.34 km

2.

Converting units

$$33.4215 \times 10,000 = 3.34215$$

$$C \sim \frac{3.34215 \times 10^5}{1 \times 10^5}$$

$$33.4 \text{ km}$$

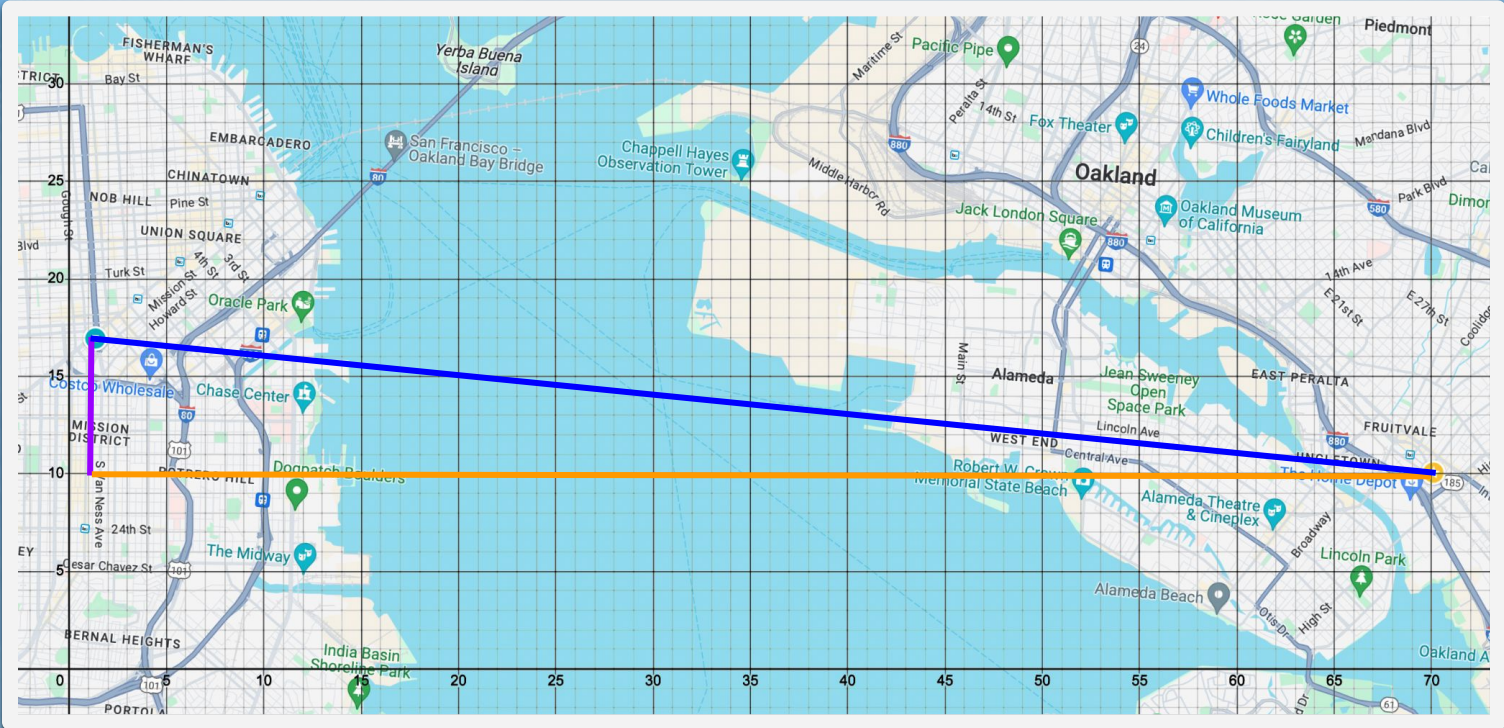
★ = Ascend

☁ = Alameda beach

Why we use Pythagorean Theorem is because it helps you solve problems involving right triangles. It also helps by measuring distances like what we are doing to find the distance between Ascend and Alameda beach.

Pier 49

Solved by:
Osman, Luna, Erica, Anthony



Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

$$7^2 + 69^2 = c^2$$

$$49 + 4761 = c^2$$

$$4810 = c^2$$

$$\sqrt{4810} = \sqrt{c^2}$$

$$c = 69.3541$$

First we used the Pythagorean Theorem to solve. We squared our two side lengths to find the value of c. Which means we multiplied the values by themselves. {7x7=49 and 69x69= 4761}

To find the distance in cm we multiplied our answer of 69.35541 by 25.000 {1 unit}, and our estimate is 1733852.5

After converting our units to km, we multiplied by 10¹, which is just 10 so we move the decimal place back one space.

We rewrote 1733852.5 cm in scientific notation by counting how many numbers there are before the decimal and that is our exponent.

1 unit = 25.000 cm

Converting into kilometers:

1 km = 100,000 cm
= 1 × 10⁵ cm

$c = 1.733 \times 10^6$ cm
1 × 10⁵ cm

$c = 1.733 \times 10^1$ cm
 $c = 17.33$ cm

Scale:

1 unit = 25,000 cm

$c = 69.3541 \times 25,000$ cm

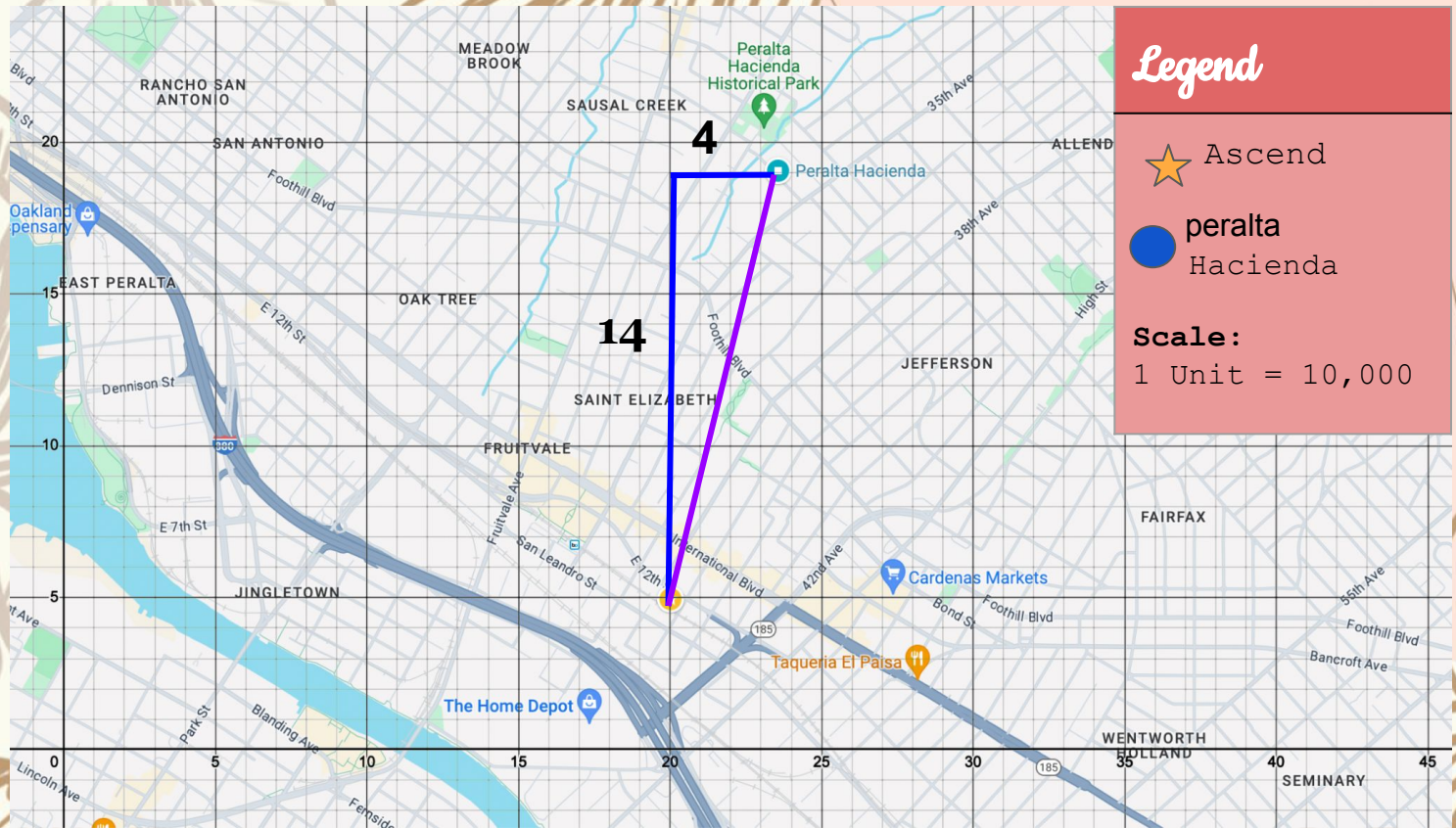
$c = 1733852.5$ cm

Scientific notation:

$c = 1.733 \times 10^6$ cm

Pier 49 is approximately 17.33 km away from ASCEND.

Peralta hacienda



1 Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

$$14^2 + 4^2 = c^2$$

$$196 + 16 = c^2$$

$$\sqrt{212} = \sqrt{c^2}$$

$$c = 212$$

$$c \sim 14.5602$$

First we did Pythagorean Theorem because we formed the right triangle. We got 14 and 4 from counting for every full square

2. Units

$$1 \text{ unit} = 10,000$$

$$c \sim 14.5602 \times 10,000 \text{ cm}$$

$$c \sim 145,602 \text{ cm}$$

When we divide 10^5 by 10^5 we subtract the exponents and get 10^0 , anything to the power of 0 is 1

3. Scientific notation:

$$c \sim 1.456 \times 10^5 \text{ cm}$$

4 Converting units:

$$1 \text{ km} = 100,000 \text{ cm}$$

$$\text{cm} = 1 \times 10^5 \text{ cm}$$

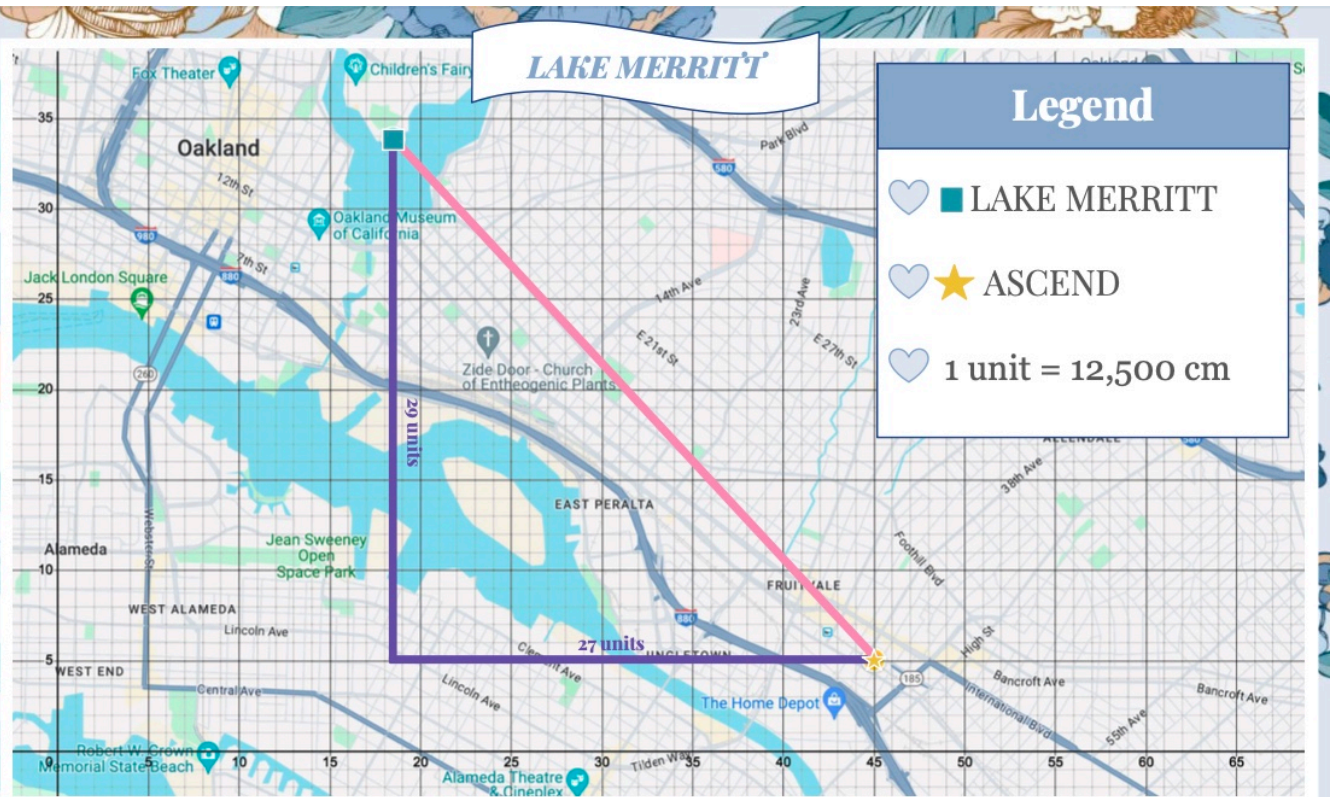
$$c \sim 1.456 \times 10^5 \text{ cm}$$

$$1 \times 10^5 \text{ cm}$$

$$c \sim 1.456 \times 1 \text{ km}$$

$$c \sim 1.456 \text{ km}$$

Peralta hacienda is approximately 1.456 km away from ASCEND



1. Pythagorean Theorem:

The reason why we use pythagorean theorem is to find the distance between to areas

$$a^2 + b^2 = c^2$$

$$29^2 + 27^2 = c^2$$

$$841 + 729 = c^2$$

$$1570 = c^2$$

$$\sqrt{1570} = \sqrt{c^2}$$

$$c \sim 39.6232$$

The reason why we say approximately is because we are rounding our answer

4. Converting units:

$$1 \text{ km} = 100,000 \text{ cm}$$

$$= 1 \times 10^5 \text{ cm}$$

$$c \sim \frac{4.9259 \times 10^5 \text{ cm}}{1 \times 10^5 \text{ cm}}$$

$$c \sim 4.9529 \times 1 \text{ km}$$

$$c \sim 4.9529 \text{ km}$$

The reason why we convert our answer is to make sure our unit of measurement is appropriate.

2. Scale: 1 unit = 12,500 cm

$$c \sim 39.6232 \times 12,500 \text{ cm}$$

$$c \sim 495290 \text{ cm. The reason why we multiply by 12}$$

3. Scientific notation:

$$c \sim 4.9529 \times 10^5 \text{ cm}$$

Lake Merritt is approximately 4.9529km away from ASCEND.

Solved by: Alondra C, Andrea C, Kervin O.

DIAMOND PARK

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

$$29^2 + 3^2 = c^2$$

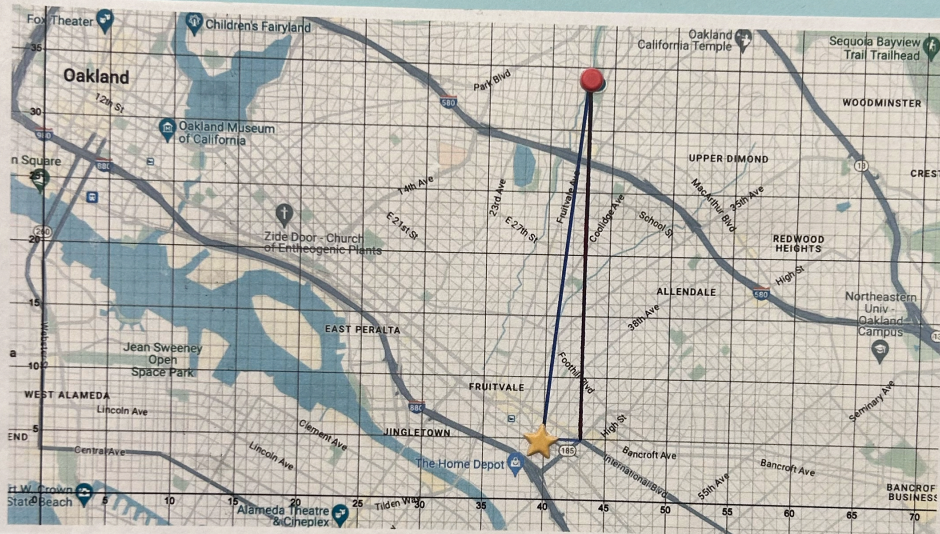
$$841 + 9 = c^2$$

$$850 = c^2$$

$$c = \sqrt{850}$$

$$c \sim 29.154 \rightarrow$$

there is more numbers that's why approximately



CONVERTING CM INTO KM:

$$c \sim 29.154 \times 12500 \text{ cm}$$

$$c \sim 3.64425 \text{ km}$$

$$3.644 \times 10^5$$

converting to km

$$\frac{3.644 \times 10^5}{1 \times 10^5} = 3.644 \text{ km}$$

final result

THE EXPONENT CANCELS OUT IF YOU ARE DIVIDING THE SAME POWER.

LEGEND

★ ASCEND

● DIAMOND PARK

1 UNIT = 12,500 cm

CONVERTING CM INTO KM IS APPROPRIATE WHEN MEASURING LARGE DISTANCES.



Tide Water ^{to} park

LEGEND

- ★ ASCEND
- Tidewater

Units:
10,000m

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

$$14^2 + 2^2 = c^2$$

$$196^2 + 4^2 = c^2$$

$$\sqrt{200} = \sqrt{c^2}$$

$$c = \sqrt{200}$$

$$c \sim 14.1421$$

PT is an equation when we can use when we have a right triangle and we don't know one side length

The legend keeps important parts of the maps

Scientific Notation

$$c \sim 1.41421 \times 10,000$$

$$c \sim 141,421$$

$$c \sim 1.414 \times 10^5 \text{ cm}$$

we have to convert from cm to km because tide water is too far to measure in cm.

$$1 \text{ km} = 100,000 = 1 \times 10^5$$

$$\frac{1.41420 \times 10^5 \text{ cm}}{1 \times 10^5 \text{ cm}}$$

$$1.4142 \text{ km}$$

So we think Tidewater park is approximately 1.4142 km away from ASCEND :)

ALAMEDA BEACH



Legend
 ★ ASCEND
 Alameda Beach

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

$$21^2 + 26^2 = c^2$$

$$441 + 729 = c^2$$

$$1170 = c^2$$

$$c = \sqrt{1170}$$

$$c \approx 34.2052675$$

Scientific Notation

$$34.5262 \times 10,000 \text{ cm}$$

$$c \approx 345262.$$

$$3.45262 \times 10^5$$

$$1 \times 10^5 \text{ cm}$$

$$3.45562 \text{ km}$$

Solved by:

Ana H. and Natalya Prince

Alameda Beach to ASCEND is 3.45562 km

WE USE THE PYTHAGOREAN THEOREM WHEN WE HAVE A RIGHT TRIANGLE. WE CAN USE THE EQUATION $a^2 + b^2 = c^2$ TO FIND THE MISSING SIDE LENGTH IN THIS CASE IT IS THE DISTANCE BETWEEN ASCEND AND ALAMEDA.

WE USE SCIENTIFIC NOTATION TO WRITE LARGE AND SMALL NUMBERS. IT MAKES IT EASY TO OPERATE (+ - * /) WITH LARGE AND SMALL NUMBERS.



LAKE MERRITT

DIMOND PARK

PERALTA HACIENDA

PIER 14

OCEAN BEACH

PIER 39

ALAMEDA BEACH

PIER 49