# Math Trail Project

## MATH 313-1002

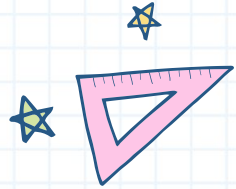By: Vanessa Perez, Catherine Carrington, Aileen Duarte, Patricia Bolaños, Pamela Arroyo, Elizabeth Lai

# Location

San Diego State University Campus

# Situation #1

The location chosen for this problem is the gradually sloped hill on San Diego State University's campus. This hill is just to the left of Hepner Hall as you are walking towards Storm Hall. It is specifically located in between the turtle pond and the Communications building. As you walk down this slope you can see the cafeteria 'Olive Oil Cafe' and Storm Hall in the distance.

# View going down the hill

# View going up the hill

Video of Catherine walking down the hill!

# Word Problem

In order to make it to her linguistics class on time, Catherine took a shortcut and walked down the hill in between the communications building and the turtle pond. During the time that she walked down the hill, she walked at a rate of 2 ft/ sec. for 1 minute. What is the total distance that Catherine walked on this hill?

## Class Content

- Slope

- Linear equations

- Rate

## Meaningfulness

- This problem was meaningful to all of the members in our group because we all walk up and down this hill every week in between our classes.
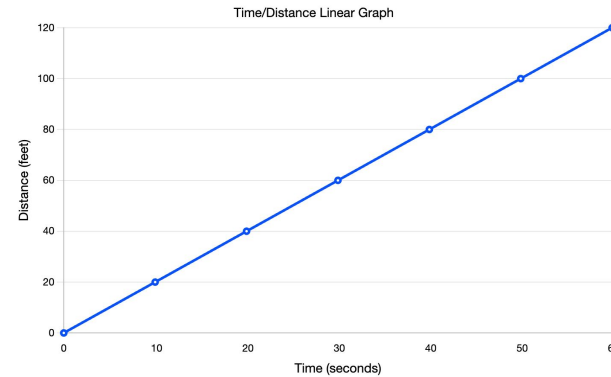
## Creativeness

- Our problem is creative because we are taking the mathematical concepts of slope, linear equations, and rates that we have been learning inside of the classroom and and applying them to our everyday experiences outside of the classroom.

# Table

| Time (sec.) | Distance (ft) |
|:---:|:---:|
| 0 | 0 |
| 10 | 20 |
| 20 | 40 |
| 30 | 60 |
| 40 | 80 |
| 50 | 100 |
| 60 | 120 |

# Graph

Time/Distance Linear Graph
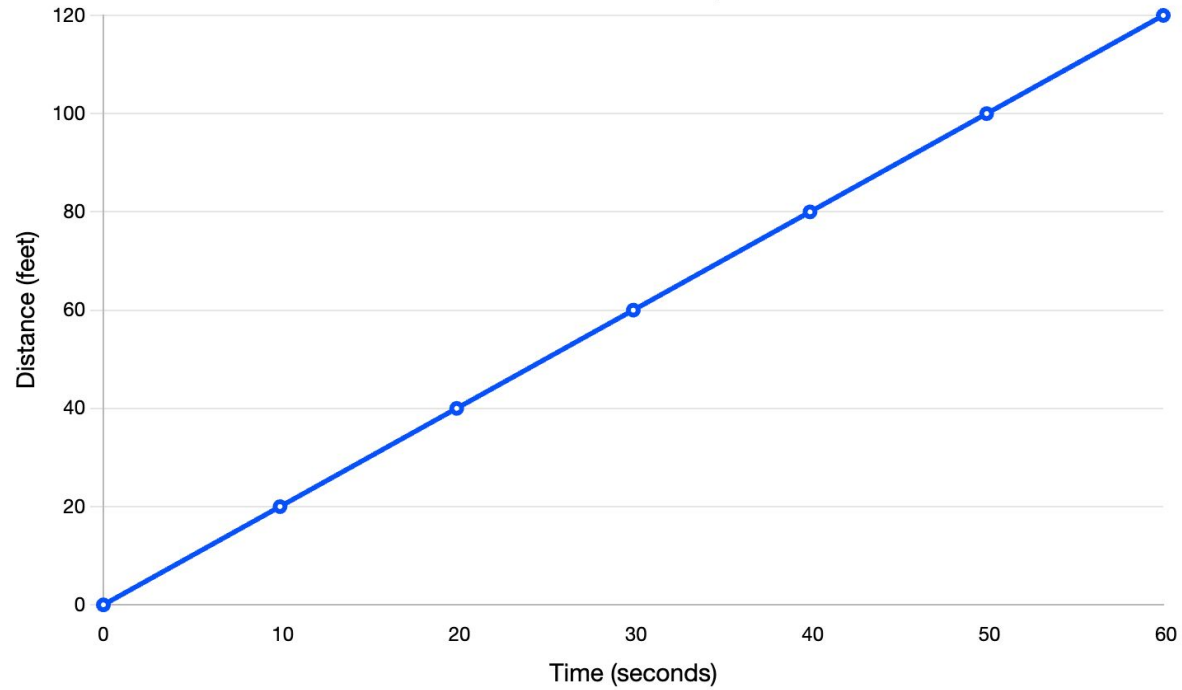
# Equation

- d= (speed)(time)
- y= 2x
- Y represents the total distance
- 2 represents Catherines rate per second
- X represents seconds that she walked

**1**
**2**

## Time/Distance Linear Graph

# Solution and Final Answer

2 feet x 60 seconds = 120 feet traveled
Catherine walked down the hill at a rate of two feet per second for one minute. Therefore, in order to find how many feet she traveled in total, we need to multiply the speed she's walking by the amount of time she was walking for. Multiplying those two products results in the outcome of 120 feet traveled.
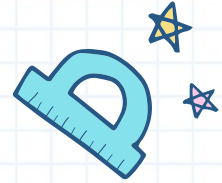
# Location

## SDSU TROLLEY STATION
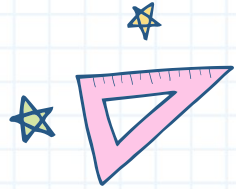
# Situation #2

Public transportation is an environmentally friendly way to travel throughout San Diego. The Green Line trolley arrives at different times during the day and stops at Alvarado, 70th Street, grossmont before arriving at SDSU.  The station is located  slightly south of the Cal Coast Credit Union Amphitheatre on campus. .

Map of different trolley lines in San Diego

Time stamps of the Green Line trolley

# Word Problem: Trolley

Jennie takes the trolly from school to get home. She looks at the times of the next trains. **Train A** is 6 miles away, and arriving in **2 minutes;** **Train B** is **13 minutes away,** and **Train C** is **27 mins** away. While jennie waits for the next train, she decides to find the distance of the trains from her. Jennie knows that all the trains move at a constant speed. What is the distance of each train from Jennie?

## Class Content

- **Linear functions**

- **Graphing**

- **Solving linear equations**

## Meaningfulness

- **This problem was meaningful to all of the members in our group because we have all taken/regularly take the green line trolley.**
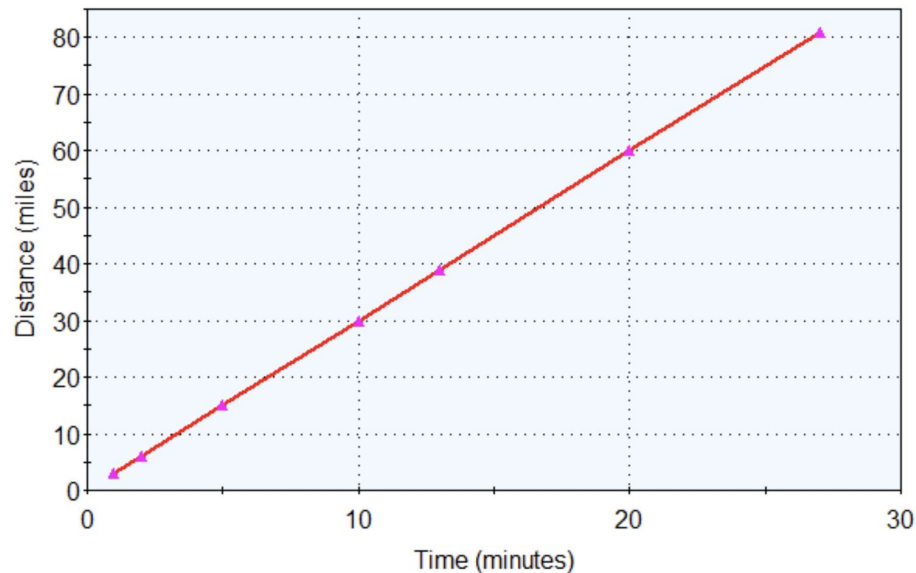
## Creativeness

- **Our problem is creative because we are taking the mathematical concepts of linear functions, graphing, and solving linear equations and applying them to real life situations such as figuring out how far away the trolleys are from SDSU.**

## Table

| Minutes | # of miles train will travel |
|---------|------------------------------|
| 1 | 3 |
| 2 | 6 |
| 5 | 15 |
| 10 | 30 |
| 13 | 39 |
| 20 | 60 |
| 27 | 81 |

## Graph

**Miles train has traveled per minute**



## Equation

m=mins

f(x)= m (3) → how many miles each train will travel

# Solution and Final Answer

If we know that all the trains travel at a constant speed, and train A travels 6 miles in 2 minutes, we can divide both 6 and 2 by 2 to figure out how the distance traveled per train in 1 minutes.

$6 \div 2 = 3$  and  $2 \div 2 = 1$  so each train travels 3 miles per minute.

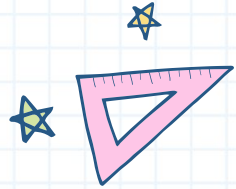Using the equation $f(x)=m(3)$, we can figure out how far each train is from Jennie at any given time.

- Train A; 2 minutes away: 6 miles away → 2 mins x 3= 6 miles
- Train B; 13 minutes away: 39 miles away → 13 mins x 3= 39 miles
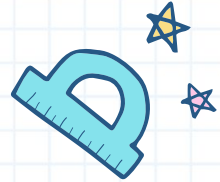- Train C; 27 minutes away: 81 miles away → 27 mins x 3= 81 miles

# Location

## Aztec Market

# Situation #3

The location chosen for this problem is at the Aztec Market. The store is on the right of Storm Hall on the San Diego State University campus. These markets often have a selection of pre-made sandwiches, wraps, salads, and snacks for students and faculty on the move.

Pictures from inside the Aztec Market. Our word problem is modeled after these delicious donuts!

# Word Problem: Donuts!

Nadia's schedule has been insanely busy lately with school, work, and bodybuilding training. This weekend she wasn't able to make time for meal prepping and will have to rely on some leftovers in the fridge and probably grab snacks/meals from school. In between classes she grabbed a quick breakfast at the Aztec Market. She decided to treat herself and bought strawberry cheesecake donuts. After eating the delicious donuts, Nadia would like to calculate her calorie intake for the day to make sure she's meeting her dietary goals on her dirty bulk. The package contains 6 donuts, she ate them increments of 2. For every 2 donuts she consumed a total of 140 cals. How many calories are in one donut? Would you be able to help her determine if there is a proportional relationship in this particular situation?

## Class Content

- **Linear functions**
- **Proportional relationship**
- **Graphing**

## Meaningfulness

This problem was meaningful to all members of the group because we tend to keep track of our calorie intake for health purposes.
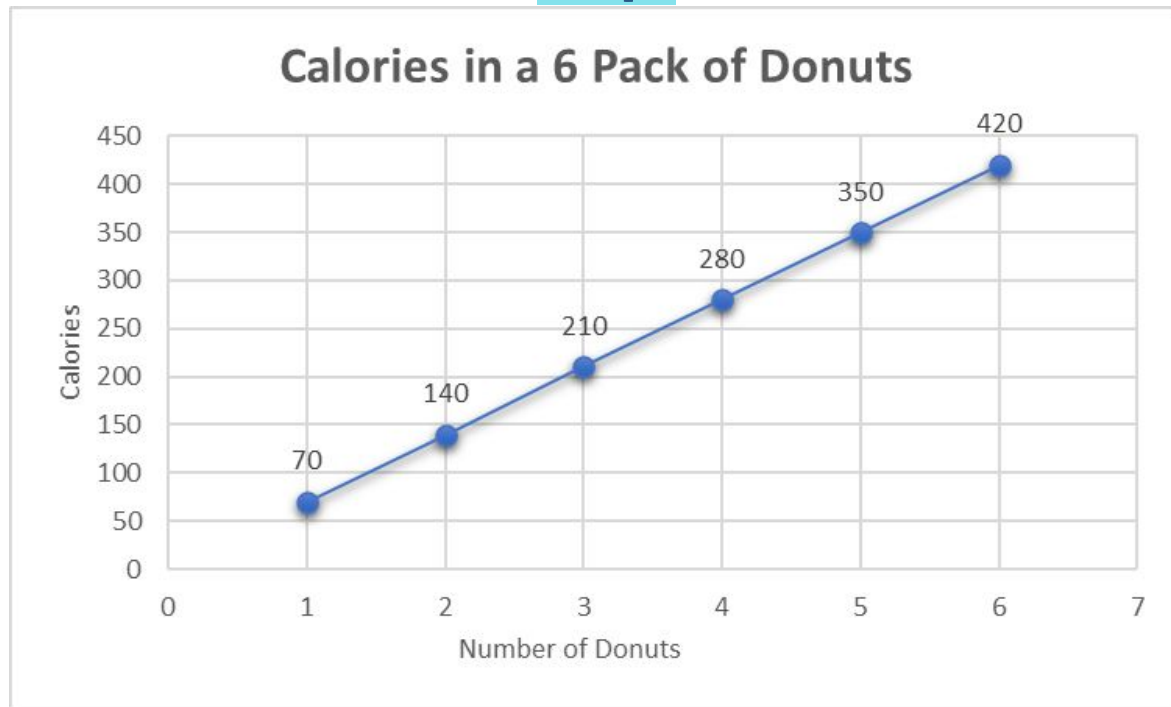
## Creativeness

Our problem is creative because we are applying mathematical concepts learned in the classroom such as linear functions and proportional relationships to real life scenarios. In this case we are using math as a tool to help Nadia reach her fitness goals.

## Table

| Donuts | Calories |
|--------|----------|
| 1 | 70 |
| 2 | 140 |
| 3 | 210 |
| 4 | 280 |
| 5 | 350 |
| 6 | 420 |

## Graph

### Calories in a 6 Pack of Donuts



## Equation

$C = 70x$

C= total calories

X= number of donuts

70= number of calories in each donut

# Solution and Final Answer

2 donuts = 140 calories
$140 \div 2 = 70$ calories per donut

There is a proportional relationship between the number of donuts consumed and the total amount of calorie intake.

Since there are 70 calories per donut, for every donut eaten the total amount of calories consumed will consistently increase by 70. The constant increase determines this is a proportional relationship.

# Thank You!