Changing the Starting Point

Henry and Emilio

In Ms. Porter's gym class, Emilio finds out that his walking rate is 2.5 meters per second. When he gets home from school, he times his little brother, Henry, as Henry walks 100 meters. He figures out that Henry's walking rate is 1 meter per second.

Henry challenges Emilio to a walking race. Because Emilio's walking rate is faster, Emilio gives Henry a 45-meter head start.

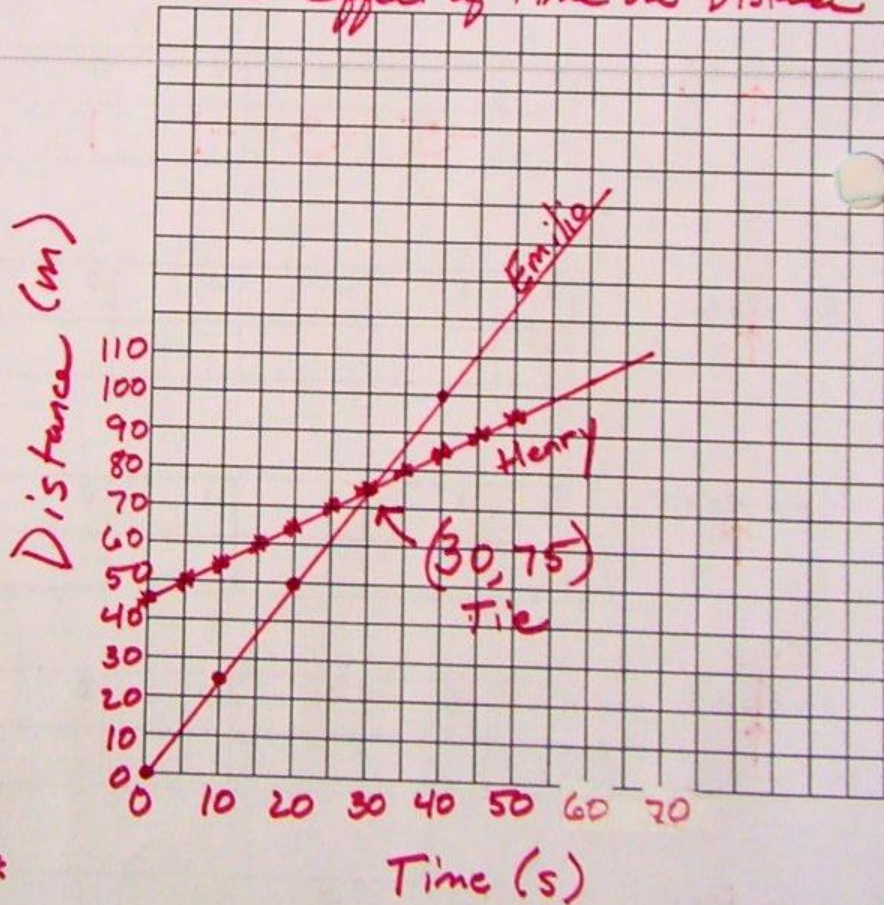1) Name the independent variable: (x) time (s)

Name the dependent variable: (y) distance (m)

2) Make a table to show the relationship between the time in seconds and the distance in meters for every 5 seconds.

3) Make a graph of your data. You will need to extend your graph to 35 seconds and 85 meters.

	Distance (meters)	
Time (seconds)	Emilio (2.5)	Henry (1)
0	0	45
5	12.5	50
10	25	55
15	37.5	60
20	50	65
25	62.5	70
30	75	75
35	87.5	80
40	100	85
45	112.5	90
50	125	95

The Effect of Time on Distance

Distance (m)

Emilio
Henry
(30, 75) Tie

110 100 90 80 70 60 50 40 30 20 10 0

0 10 20 30 40 50 60 70

Time (s)

Key
Emilio •
Henry *

●) Emilio knows his brother would enjoy winning the race, but he does not want to make the race so short that it is obvious his brother will win. What would be a good distance to make the race so that Henry will win in a close race? **4.5 ou 74m** Explain how you arrived at your answer. **The distance should be just a littl less than 75m (tie)**

5) What would be a good distance to choose if Emilio wants to beat his brother but wants the race to be close? **75.5 or 76** Explain. **Should be just more than 75m**

6) Write an equation to calculate the distance, d, given any time, t, for each brother.

Emilio: **$d = 2.5t$**   Henri: **$d = 1t + 45$**

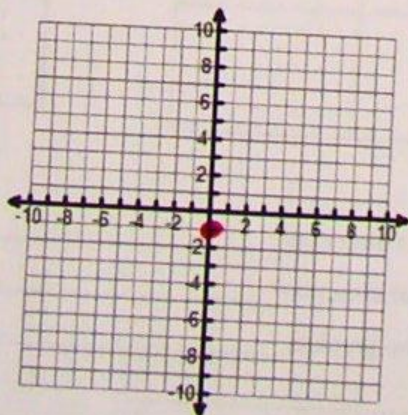7) Use the equations to calculate how far each brother would travel in one minute. Show your work. **$t = 60$**

	Emilio	Henri
Equation ⟹	$d = 2.5t$	$d = 1t + 45$
Substitution ⟹	_____	_____
Solution ⟹	_____	_____

7) Use the equations to calculate how long each brother would take to walk (300 meters) Show your work. **$d = 300$**
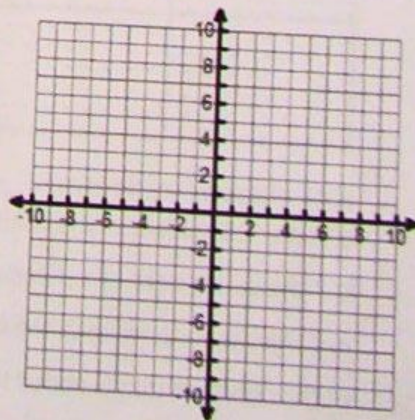
Equation ⟹	_____	_____
Substitution ⟹	_____	_____
Work ⟹	_____	_____
Solution ⟹	_____	_____

Complete the following blanks given the table.

x	y
-2	-3
-1	-2
0	-1
1	0
2	1

x	y
-2	-4
-1	-1
0	2
1	5
2	8

Rate: _____

Starting point: **−1**
Starting point is always where x=0)

Equation: **$y =$** _____

Rate: _____

Starting point: _____

Equation: _____

| Discrete	Continuous
Values or observations that is counted as **distinct and separate** and can only take particular values. Examples: the number of kittens in a litter; number of threads in a sheet, number of stars given for an energy rating.	You can **measure** continuous data. Values or observations **may take on any value** within a finite or infinite interval. Examples: height, time and temperature.

Identify each as continuous or discrete.

1. Number of channels on your TV *d*

2. A person's age

3. Elements on the Periodic Table

4. The time of day

5. The day of the week

6. Population of a Species

7. Number of genes in our DNA

8. Length of a piece of rope

9. How happy you feel right now

10. The speed you are walking

Examples of Independent and Dependent Variables
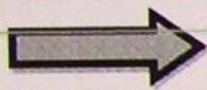
DEPENDENT	INDEPENDENT
Cell phone bill	Minutes used
How far you can drive	The amount of gas you have
Your math grade	The number of assignments you turned in
How much money you earn	The hours you work
Cost of a speeding ticket	How many miles you went over the speed limit
Time it takes to drive somewhere	How fast you drive
Result of a football game	Who scores more points
How much air conditioning you use	Temperature
Total calories and fat	Number of cookies
Opportunities for high-paying jobs	How much education you have

Identify the independent and the dependent variable in each scenario.

1) The older John gets, the taller he is.

2) The more gallons of milk I have, the more cups of milk I have.

3) In the United States House of representatives, the number of Representatives from a state is calculated based on its population.

4) The number of seats in a movie theater determines how many tickets can be sold.

5) As a plane descends, the more time that passes, the lower the plane's altitude is.

6) It costs $0.99 for a music download. The more music I download, the more money I spend.

7) The more tickets I sell, the more money I have.

8) Judah brings reusable shopping bags from home whenever he goes to the grocery store. The number of bags he brings is based on how many products are on his shopping list.

9) At a deli counter, the price of a customer's order is based on its weight.

10) Vera and Elizabeth are going hiking and are trying to figure out how many snacks they should bring with them on the hike. The longer they plan to hike, the more snacks they should bring.

11) Amelia is making mushroom tarts for a party. The number of tarts she can make will be determined by how many mushrooms are in the fridge.

12) Taylor's dad is building a case for his trophies. The number of trophies will determine how many shelves the case will have.

	Independent (x)	Dependent (y)
1	Age	Height
2	Gallons	Cups
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		