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(A) **Fast Five**

Recall that one of our key ideas in the definition of mathematics was “interrelationships between numbers” → so to investigate “interrelationships”, graph the following data sets on the grids provided:

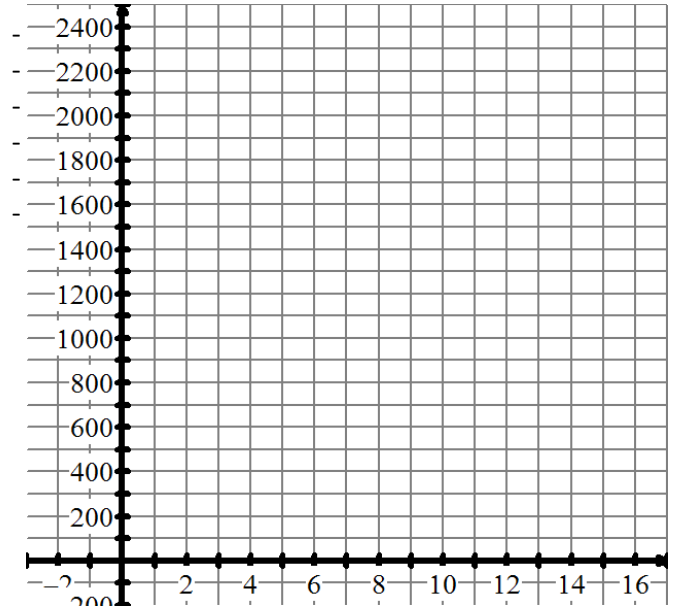
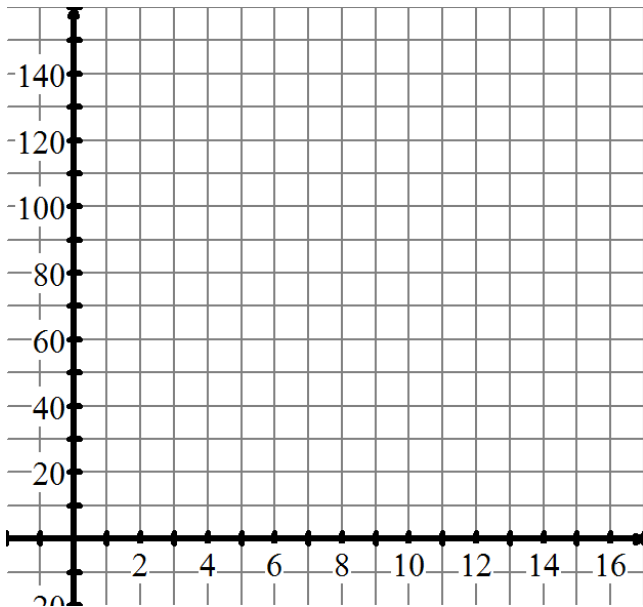
(A) Wages

Time Worked (h)	Pay for Mr S. (\$)	Pay for Mrs S. (\$)
0	0.00	0.00
2	15.00	20.00
4	30.00	40.00
6	45.00	60.00
11	82.50	110.00
15	112.50	150.00

(B) Club Memberships

Number of Visits	Rockwell Club (php)	Metropolitan Club (php)
0	200	0
2	440	300
4	680	600
6	920	900
11	1520	1650
15	2000	2250

- (a) What patterns do you observe in the data set PRIOR to graphing?



(b) What patterns do you observe in the GRAPH of the data set?

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(B) Explorations/Development

Now let's generate our own data → let's investigate the relationship between the distance walked along a stair/hallway and the time taken to travel these distances.

- KEY INSTRUCTION → WALK AT A STEADY PACE THROUGHOUT THE ACTIVITY

(1) SLOW PACE

Time (sec)						
Distance (m)						

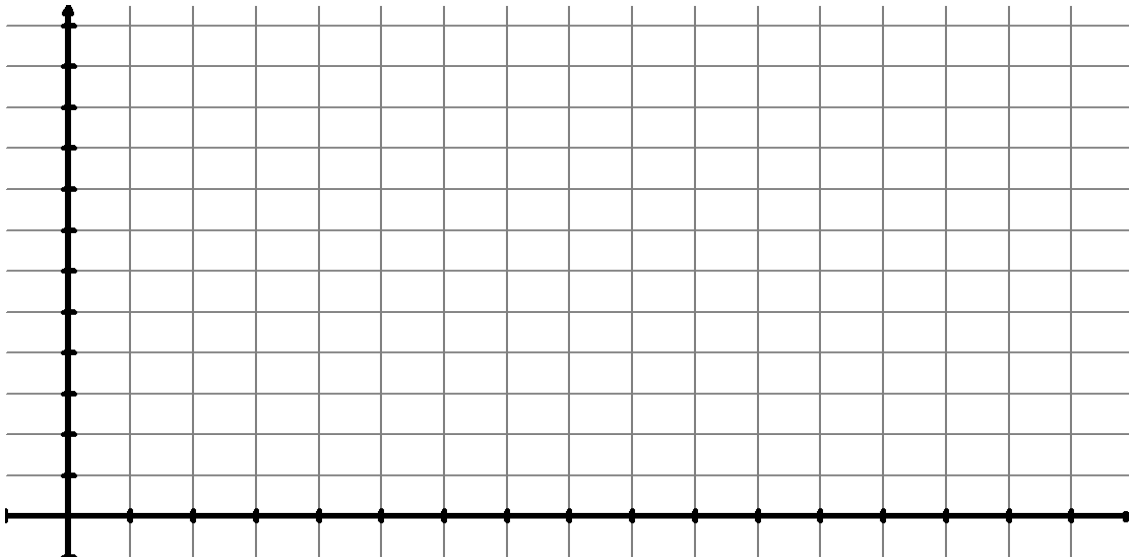
(2) MODERATE PACE

Time (sec)						
Distance (m)						

(3) FAST PACE

Time (sec)						
Distance (m)						

- (a) What patterns do you observe in the data set PRIOR to graphing?



- (b) What patterns do you observe in the GRAPH of the data set?
- (c) Mathematicians use the word SLOPE when describing data and graphs that show a linear pattern (a linear equation). From this activity, what do you think slope might mean?

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(C) Classwork

Definition for SLOPE → a measure of the steepness of the line; the ratio comparing the vertical change (called rise) and the horizontal change (called run) between 2 points

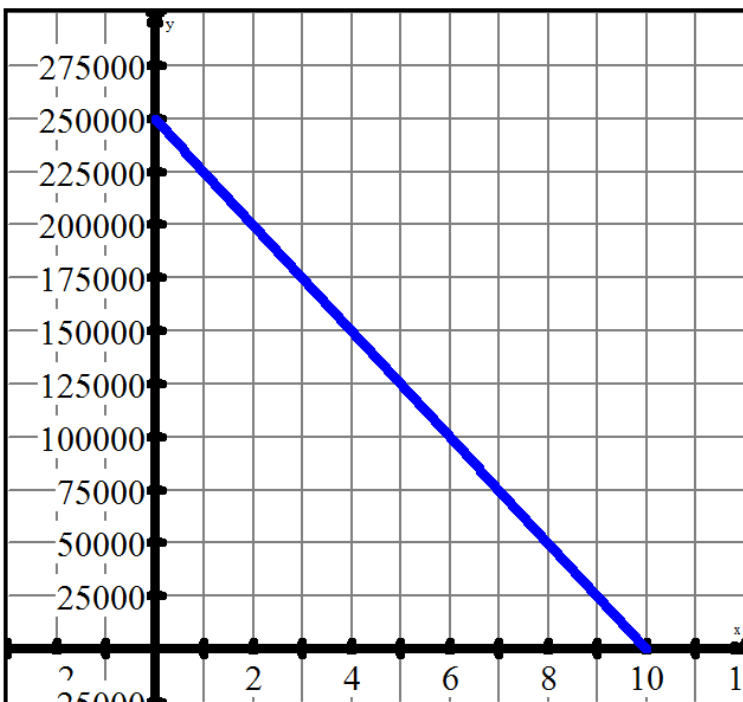
Rate of change → the change in one variable compared to the change in the other variable

Formula → $\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Question 1 – Mr S. bought a car for php 250,000. The graph below shows the value of my car for the first 3 years. The table of values shows the same information. Likewise, the equation for this linear relation is:

Value =

OR $y =$



First differences	Age of car, x, in years	Value of car, y, in php	First differences
	0	250,000	
	2	200,000	
	4	150,000	
	6	100,000	
	7	75,000	
	9	25,000	

- Calculate the amount by which Cole's car decreased in value between years 1 and 2.
- Calculate the **rate of change** in the car's value between years 1 and 4.
- Calculate the **slope** of the graph between years 1 and 4.
- How does the SLOPE of the graph (in Part c) compare to your answer in Part (a)
- Calculate the **first differences** on the table. How do the differences compare to the slope in Part (c)
- Write an equation for the relationship between the car's age and its value.
- Determine the y-intercept of the graph. What does it represent?
- Determine the x-intercept of the graph. What does it represent?

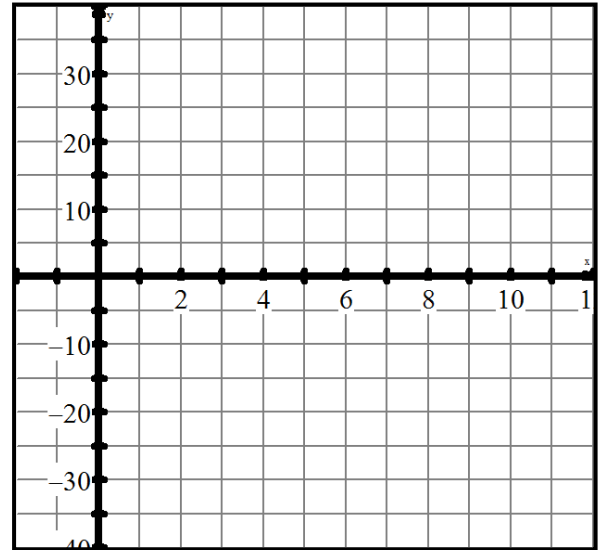
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Question 2 – When travelling in an airplane, the air temperature outside the plane changes as the altitude of the airplane changes. While flying to Manila after his summer break, Mr S recorded the following data:

Altitude (km)	6.0	7.0	7.6	8.1	8.7	9.0	9.5
Temperature (°C)	28.0	11.0	2.5	-7.7	-17.9	-23.0	-32.5

- Which variable is the independent variable? Which variable is the dependent variable?
- Graph the data.
- Use the graph to determine the rate of change of temperature with respect to the altitude.
- If you do not wish to graph the data, how else might you determine the rate of change of temperature?
- What is the value of the x-intercept? What might the x-intercept mean?
- What is the value of the y-intercept? What might the y-intercept mean?



Question 3 - The amount of money in my son's (Alexander) bank account is modelled by the relation $A = 15000 - 750w$, where A is the amount in pesos and w is the time in weeks.

- What variable is the independent variable? What variable is the dependent variable?
- How do you know the relation is linear?
- Determine the rate of change of the money in Alexander's account.
- What does this rate of change mean?
- When will Alexander have no money in his account?
- When will Alexander have 4500 php in his account?

Question 4 – Determine slope of the line that passes through the following sets of points:

- A(3,5) and B(0,2)
- C(-3,-8) and D(-5,-6)

Question 5 – Determine 3 more points that are part of the linear relation wherein:

- the slope is $\frac{2}{3}$ and one point is (-2,4)
- The slope is $-\frac{1}{4}$ and one point is (3,1)
- Two points are E(3,5) and F(5,8)

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(D) **Homework/Resources**

- Internet Resource → <http://www.teacherweb.com/NY/Arlington/AlgebraProject/2L3SlopeasRateofChange.pdf>

- HOMEWORK:

- Help from PurpleMath with slope → <http://www.purplemath.com/modules/slope.htm>
- Help from PurpleMath with rate of change → <http://www.purplemath.com/modules/slopyint.htm>
- Practice from AlgebraLab: http://www.algebralab.org/lessons/lesson.aspx?file=Algebra_LinearEqSlopes.xml
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