

VOCABULARY FOR Moving Straight Ahead Investigation 1 and 2

Rate of change: The change in the dependent variable as the independent variable increases by 1. Also known as the **pattern of change**. The rate of change is always a unit rate.

Linear relationship: A relationship between variables that has a constant rate of change.

The graph of a linear relationship is always a straight line. The rate of change determines the steepness of the line. You can measure the rate of change in the graph by finding how much the graph goes up or down on the y-axis when you move one unit on the x-axis. You can also find it by finding the ratio of how much the dependent variable changes to how much the dependent variable changes.

For example, if someone has a pledge plan where they receive \$10 for every 20 kilometers they walk, then the rate of change is $10/20$ or $\frac{1}{2}$ (0.5).

In a table, if the independent variable is increasing by a constant amount, then the dependent variable will also increase by a constant amount. If the independent variable increases by one, then the dependent variable will increase by the rate of change. Otherwise you can find the unit rate of change by dividing the change in the dependent variable by the change in the independent variable.

In an equation, the rate of change is the coefficient of the equation (see below)

coefficient: A number that multiplies a variable. In a linear relationship, the coefficient always multiplies the independent variable and is the same as the rate (pattern) of change. The coefficient is always a number (it can be a fraction or decimal).

If the coefficient is positive, then the graph will slant upwards. If it is negative, the graph will slant downwards. If the coefficient is zero, the graph will be horizontal (flat).

y-intercept: The coordinate point where the graph crosses ("intercepts") the y axis. It is always the coordinate point on the graph when the x value is 0 (0, y). In other words, when x = 0, the value of y is the y-intercept. It is important to keep in mind that the y-intercept is both a coordinate point on a graph, but it is also the number being added in an equation (the y part of the coordinate).

proportion: A linear relationship where the ratio of y to x is the same. In a proportion, the y intercept is (0,0).

y = mx + b (Y equals mx plus b): This is the standard format of the equation for all linear relationships.

Y is the dependent variable (you can use other letters)

X is the independent variable (you can use other letters)

m is the coefficient-- the rate of change. It is a number

b is the y intercept. In an equation, it is a number.

For example:

$$y = 3x + 4$$

In this linear relationship, y and x are the dependent and independent variables. The coefficient is 3, and the y intercept is 4. If you graphed this equation, the graph would go through the point $(0, 4)$

$$y = 3x - 4$$

In this linear relationship, the 4 is being subtracted, not added. This equation is the same as $y = 3x + (-4)$, so the y intercept is -4. If you graphed this equation, the graph would go through the point $(0, -4)$

For Alana's pledge plan: $A = 0.5d + 5$

A and d are the dependent and independent variables (y and x). In this case, they represent the total amount she receives, and the distance she walks.

0.5 is the coefficient- the rate of change. It is the amount she receives for each kilometer
5 is the y intercept-- the graph would go through the point $(0,5)$. \$5 is the amount she receives without doing any walking

For Leanne's pledge plan: $A = 10$

This could be rewritten $A = 0d + 10$

0 is the coefficient-, and 10 is the y -intercept. The graph would go through the point $(0, 10)$. It means that she makes \$0 per kilometer, but has \$10 no matter what.

For Gilberto's pledge plan: $A = 2d$

This could be rewritten $A = 2d + 0$

2 is the coefficient and 0 is the y -intercept. The graph would go through $(0,0)$ which is also known as the *origin*. It means he makes \$2 per kilometer, and has nothing if he goes 0 kilometers. Since the y -intercept is 0 and this is a linear relationship, that means that Gilberto's plan is also a proportion.