**Ordering DVD’s**

If the points on the graph lie on a straight line, the function is a **linear function**.

To see if a function is linear, compare how the *y*-values change with how the *x*-values change. The **average rate of change** between any two points is $\frac{change in y}{change in x}$ .

If a function is linear, then the $\frac{change in y}{change in x}$ between any two points or ordered pairs will always give the same number (the slope) no matter which two ordered pairs you choose.

If a line goes up as we go from left to right on a graph, the line has a positive slope. Notice that as the independent variable *x* increases, the dependent variable *y* also increases. We call this an **increasing function**.

If a line goes down as we go from left to right on a graph, the line has a negative slope. Notice that as the independent variable x increases, the dependent variable *y* decreases. We call this a **decreasing function**.

The point where the line crosses the *y*-axis is called the ***y*-intercept**. This is our “starting point”. Notice that the *y* intercept is the point always that has an *x*-value of 0.

You are ordering DVD’s from a web site. They charge $14 for each DVD. For any order you must pay an additional $6 for shipping and handling. Your total cost is a function of how many DVD’s you order.

1. What is the independent variable?
2. What is the dependent variable?

|  |  |
| --- | --- |
|  |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |

1. Fill in the headings and complete the table to the right.
2. As the number of DVD’s increases, what happens to the total cost? Does it increase or decrease?
3. Is this function linear? Explain why or why not.
4. If you have only $100 to spend, what is the maximum number of DVD’s you may buy? Explain.
5. a. Plot the points from the data in the table. Let *x* represent the number of DVD’s and let *y* represent the total cost. Make sure to label your axes and choose an appropriate scale.



b. Draw a line through the plotted points.

1. As you move along the line from left to right, does the line increase or decrease?
2. Where does the line intercept the *y*-axis (cost)? What is special about the *y*-value at this point?
3. What is the meaning of the point (5, 76)?
4. The equation $y=14x+6$ can be used to model this situation where *y* is your total cost for ordering *x* DVD’s. The coefficient of *x* is 14. What is the real-world meaning of this number?
5. The constant term is 6. What is the real-world meaning of this number?
6. As the independent variable increases, the dependent variable also increases. Does this mean it is an *increasing function* or a *decreasing function*?