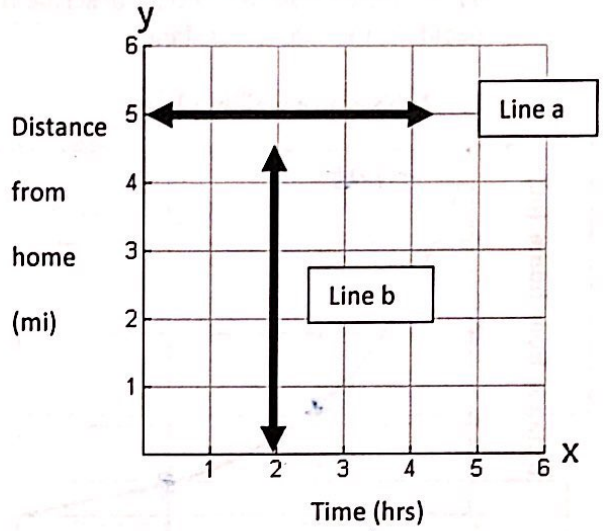
Name: 7th Period Date: _____ Hour: _____

Unit 3a Day 1: Constant vs Constant Rate

Focus Question: What is the difference between a constant position and a constant rate of change?

A. What we know about **constant** so far…
Use the following two lines on the graph

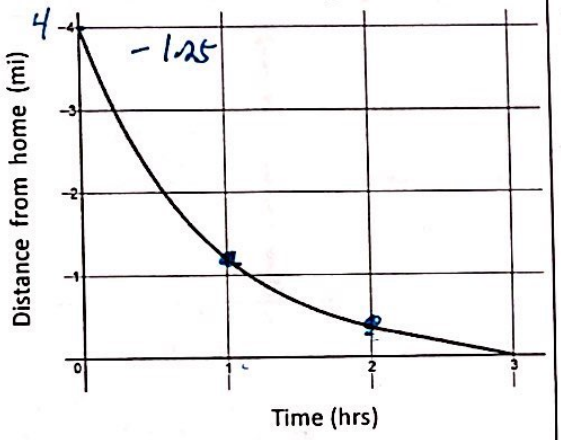


1. Which line is not a function? line b
2. Explain why your choice is not a function.
   More than one y value on an x-value
3. Write the equation of the line. x=2
4. The graph is telling you that after two hours the person is 1 and 2 and 3 and 4 miles from home. Is this even possible? no
   We would say that their miles per hour (4mi/0hr) is impossible or ∅.
5. Which line is a function? line a
6. Write the equation of this line. y=5
7. The line you chose is a horizontal line and is neither increasing or decreasing so it is constant.
8. Be specific and explain **what exactly is remaining constant.**
   Distance or the dependent variable
9. At what speed is the person driving in the constant function? Explain.
   0mph The time changed, but not the distance
10. Speed (miles per hour) is an example of a rate of change (or rate for short). Another example is how many words per minute you can type. What other rates can you think of?
    Km/h · m/s bpm
11. What did all of your rates have in common?
    DV/IV y/x rise/run

B. Constant Rates of Change
For each graph below, identify the IV and DV and decide if the graph (DV) is constant.

Then, decide how you would describe the rate of change and find it for each hour. Use this to help you decide if the rate is constant.

1. Robbie was walking home



IV: Time

DV: Distance

Is the GRAPH (DV) constant? Explain.
no, because the miles from home is changing

Rate of change used: mi/hrs

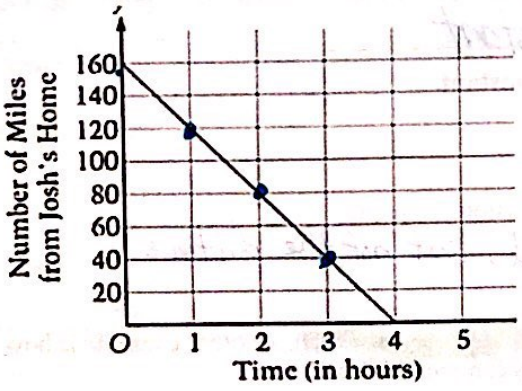
The 1st hour the distance changes by 2.75 mph

The 2nd hour the distance changes by .75 mph

The 3rd hour the distance changes by .5 mph

Is the RATE constant? Explain.
no because his speed kept changing

2. Josh was driving home



IV: Time

DV: # of miles

Is the GRAPH (DV) constant? Explain.
No, because the miles from home is changing

Rate of change used: miles/hour

The 1st hour the distance changes by 40 mi/hr

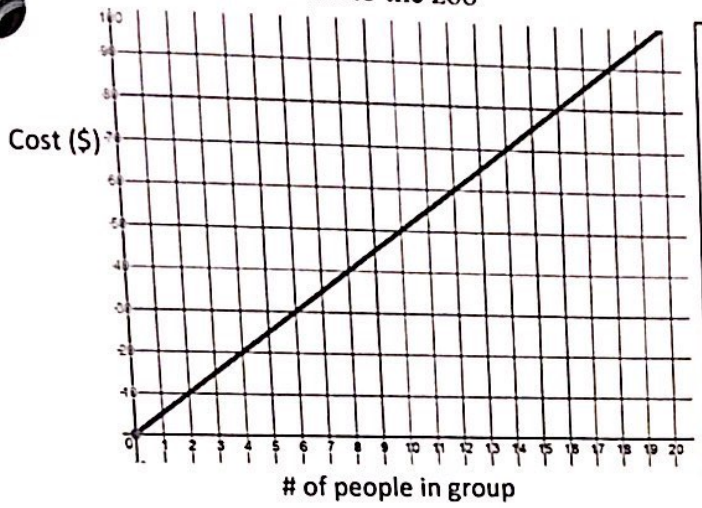
The 2nd hour the distance changes by 40 mi/hr

The 3rd hour the distance changes by 40 mi/hr

Is the RATE constant? Explain.
yes because he traveled the same speed the whole time

C. Practice deciding if each rate is constant

1. A class went to the zoo



IV: #of people in group

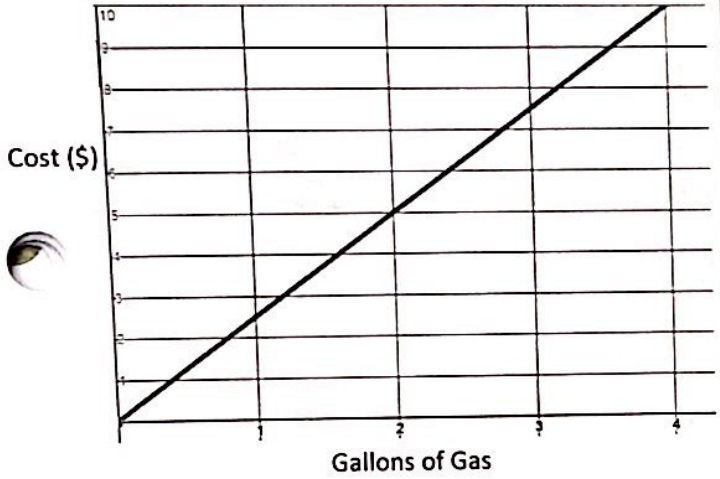
DV: Cost

Rate of change used: cost/#of people

Is the RATE constant? Explain.

yes. Cost increases by the same amount per person

2. Janet was buying gas for her lawn mower.



IV: Gallons of Gas

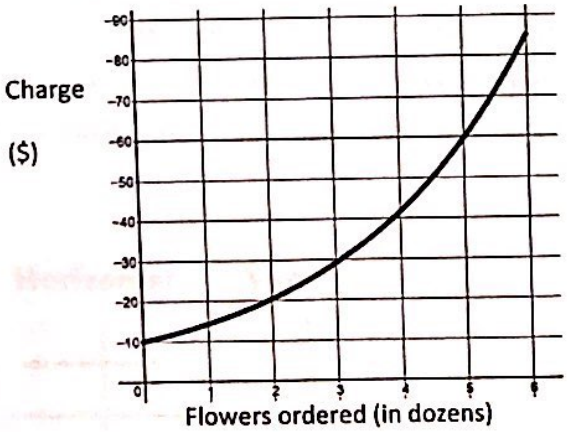
DV: Cost

Rate of change used: cost/gallon

Is the RATE constant? Explain.

yes

3. Hugo was considering ordering flowers for his wife.



IV: Flowers ordered

DV: Charge

Rate of change used: charge/flowers

Is the RATE constant? Explain.

No, The rate changes from each dozen of flowers ordered

4. What do the graphs with a constant RATE have in common?

When a graph is a **straight line** (which is indicated by a **constant rate of change**), we call it a **linear function**. This means that we can write a rule (or equation) for the line. As we go through this unit, we will practice writing rules for these functions when they are presented in different ways. One of the most important things in the equation will be the rate of change.

Using the rates you made above as examples, write the rate of change for this generic graph.

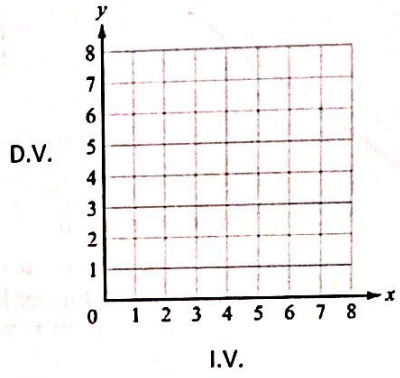
The rate in part B was miles (IV or DV) per hour (IV or DV)

The rate in part C #1 was cost (IV or DV) per # of people (IV or DV)

The rate in part C #2 was cost (IV or DV) per gallon (IV or DV)

The rate in part C #3 was Charge (IV or DV) per flowers (IV or DV)

The rate is ALWAYS DV per IV



Remember that in math we usually write rates as fractions. So the fraction would be: $\frac{DV}{IV}$