Unit 3 Notes: "The Four Views of a Function"

Question:
Do I connect the dots???

Discrete vs. Continuous Data

Whenever we collect data, there's a collection of possible values from which we record our observations. If we're flipping a coin, the possible values we can observe are H (heads) or T (tails). Or, occasionally, the very rare E (edge). If we're measuring someone's height in centimeters, the possible values are any positive number of centimeters and fractions thereof. There are two different ways to classify data based on the possible values we can observe. (Parts DO NOT make sense)

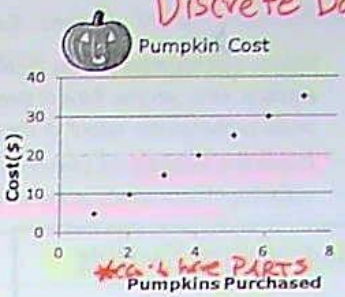
Data is **discrete** if there is clear separation between the different possible values. Either there will be a finite number of possible values, or we're counting something.

If we flip a coin and record the result there are only two possible values (ignoring that pesky "edge" thing), H and T, so our observations are discrete.

Recording the numbers of coins in different piggy banks would also give us discrete data, since there's a separation of one whole coin between any two numbers we might get. Even a half-dollar is still a whole-coin.

Sets of data that record counts of things are discrete.

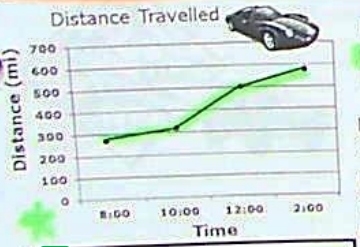
Discrete Data



Discrete Data

Don't connect!

- Counted
- Does NOT make sense to evaluate in between data
- Do NOT connect points when graphing



However, data is **continuous** if there's no clear separation between possible values. Like if two values are still kinda-sorta seeing each other, but haven't really discussed if they're an "item."

If we measure someone's height in centimeters we could get 160 cm, or 160.01 cm, or 160.001 cm (assuming we had a very accurate method of measurement). For any two possible values (say, 160 cm and 161 cm), there's another possible value between them (160.5 cm). Those infuriating numbers can always be broken down into smaller and smaller numbers. It's part of the reason we love them so much. Can't count with them, can't count without them.

Connect!

Continuous Data

- Measured
- Does make sense to evaluate in between data
- Do connect points when graphing

Sets of data involving measurements that can have fractions or decimals are generally continuous. Parts DO make sense

(Hint! Ask yourself whether PARTS of BOTH make sense!)

Practice

Write **discrete** or **continuous** next to each situation. If you made the graph, would the points be **connected**?

1. A person's height over the school year (Parts? OK) Continuous
2. The number of students in a classroom (Parts? No) discrete
3. A dog's weight during the first year (Parts? OK) Continuous
4. The temperature of dinner as it cooks (Parts? OK) (+time) Continuous
5. How many magazine subscriptions were sold (Parts? No) discrete

Independent vs. Dependent Variables

Generally speaking, in any given model or equation, variables can be divided into two categories:

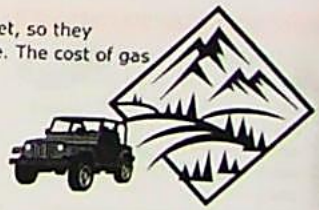
- Independent variables are the variables that are changed in a given model or equation. One can also think of them as the 'input' which is then modified by the model to change the 'output' or dependent variable.
- Dependent variables are considered to be functions of the independent variables, changing only as the independent variable does.

Independent Variable	Dependent Variable
• Input • Controlled or manipulated • X-axis	• Output • Affected by the independent variable • Y-axis

Practice (Hint! First decide which of the two DEPENDS on the other!)

Write the appropriate variable to indicate if it is independent or dependent in the given situation.

1. Callie and Hajari are going on a road trip together. They have a limited budget, so they consider several different routes and calculate the cost of gas for each route. The cost of gas for each route depends on the length of the route.



g = the cost of gas
r = the length of the route

Ex: gas cost will DEPEND on length of trip!

Independent Variable: r

Dependent Variable: g

2. Tyler is training to run a marathon at the end of the month. The more time he has spent training, the longer the distance he is able to cover during one run.

t = the amount of time Tyler has spent training
d = the distance Tyler is able to cover during one run

Independent Variable: t

Dependent Variable: d

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

p = the price
w = the weight

Independent Variable: w

Dependent Variable: p

The Four Views of a Relationship, Introduction

Campgrounds

1st View (Situation)

You and your friends are going camping. The campground charges $10.00 for each campsite. This can be described with the equation $C = 10n$, where C is the cost and n is the number of campsites rented.

2nd View

1) Write **independent** or **dependent** next to each variable.

C = the cost (Y) dependent n = the number of campsites (X) Independent

2) Describe the data as continuous or discrete. Explain your answer. Discrete - because it doesn't make sense to rent PARTS of campsites

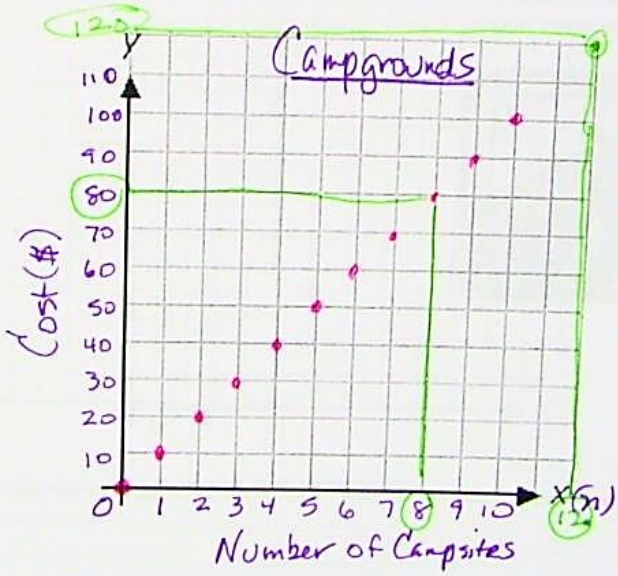
* Do Not connect points

3rd View 4th View

3) Make a table and a graph showing the cost for up to 10 campsites. Use an interval of 1 on the x-axis and 10 on the y-axis.) The graph should have a title and each axis should have a label.

Graph

X(n) Number of Campsites	Y(C) C = 10n Cost ($)
0	10(0) 0
1	10(1) 10
2	10(2) 20
3	10(3) 30
4	10(4) 40
5	10(5) 50
6	10(6) 60
7	10(7) 70
8	10(8) 80
9	10(9) 90
10	10(10) 100



4) If 8 campsites are rented, what is the cost? $80 You should be able to get your answer from the equation, the graph or the table.

C = 120

5) Use your equation to calculate the number of campsites if the cost is $120. 12 campsites (Show work.)

Equation: $C = 10n$

Substitute: $\frac{120}{10} = \frac{10n}{10}$

Solve: $12 = n$