4.1 – Interpreting Graphs
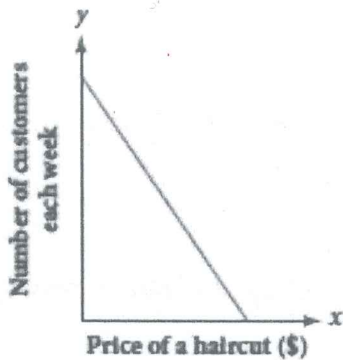
Daily Objectives:

1. Identify independent and dependent variables
2. Interpret rate of change and *x/y*-intercepts
3. Decide whether a graph is discrete or continuous
4. Draw a graph from a scenario
5. Create a scenario from a graph
6. Distinguish between linear and nonlinear change

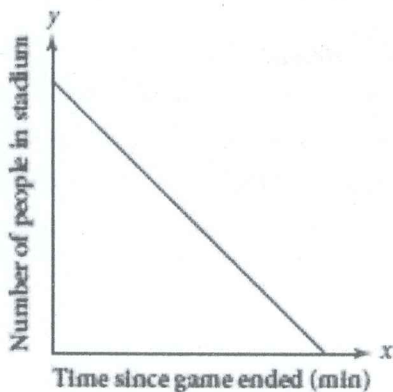**Example 1:** What is the real-world meaning of the graph below?

As the price of a haircut increases, the number of customers decreases, at a linear rate.

What is the dependent and what is the independent variable?

number of customers   *price of haircut*

Example 2: What is the real-world meaning of the graph below?

As the number of minutes since the game ended increases, the number of people in the stadium decreases.

What is the dependent and what is the independent variable?

number of people in the stadium   *minutes since game ended (time)*

Example 3: Students at Central High School are complaining that the juice vending machine is frequently empty. Several student council members decide to study this problem. They record the number of cans in the machine at various times during a typical school day and make a graph.
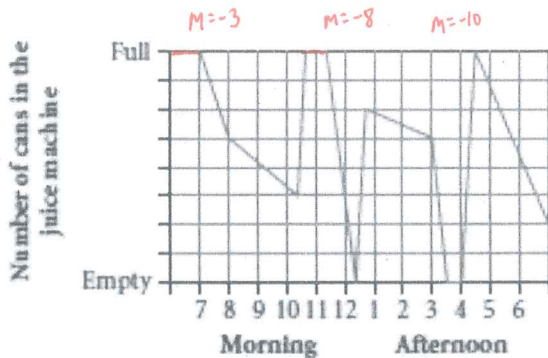
a. Based on the graph, at what time is juice consumed most rapidly?

    AT THE STEEP NEGATIVE SLOPES FROM 11:30 - 12:30 (m=-8) AND FROM 3:00 - 3:30 (m=-10)

b. When is the machine refilled? How can you tell?

    COMPLETELY REFILLED OVERNIGHT, AT 10:30, AT 4:00 (AFTER SCHOOL). IT IS PARTIALLY REFILLED AT 12:30.

c. When is the machine empty? How can you tell?

    IT IS EMPTY AT 12:20 AND IMMEDIATELY REFILLED AND FROM 3:30 - 4:00. (THE GRAPH HITS THE X-AXIS—WHEN Y=0)

d. What do you think the student council will recommend to solve the problem?

   REFILL COMPLETELY AT 12:30 OR ONCE MORE AROUND 2:30 OR 3:00.

☺ Chapter 4 Notes ☺

Example 4: Sketch a graph that reflects all the information given in this story:

"It was a dark and stormy night. Before the torrents of rain came, the bucket was empty. The rain subsided at daybreak. The bucket remained untouched through the morning until Old Dog Trey arrived as thirsty as a dog. The sun shone brightly through the afternoon. Then Billy, the kid next door, arrived. He noticed two plugs in the side of the bucket. One of them was a bout a quarter of the way up, and the second one was near the bottom. As fast as you could blink an eye, he pulled out the plugs and ran away.
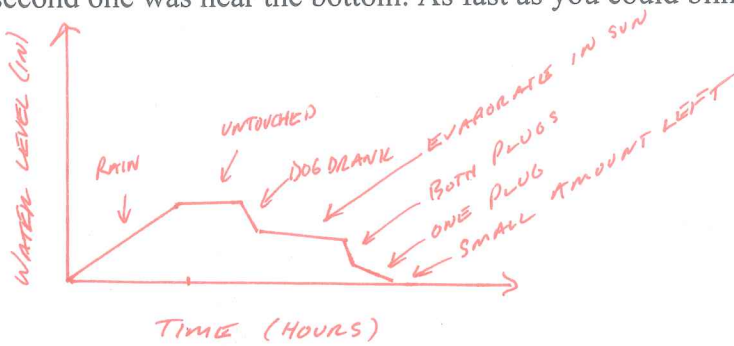
Example 5: This graph tells a story. It could be a story about a lake, a bathtub, or whatever you imagine. Write a story with your group that conveys all the information, including when and how the rates of change increase or decrease.
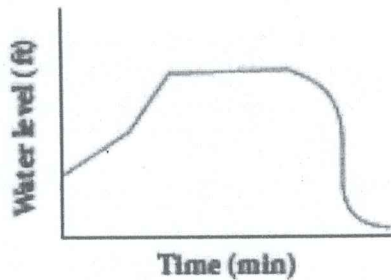
LUIS AND LORETTA HAVE A SMALL SWIMMING POOL. THE CHILDREN WANT TO USE THE POOL, BUT THE WATER LEVEL IS VERY LOW, SO LUIS TURNS ON THE HOSE AND BEGINS FILLING THE POOL AT A CONSTANT RATE. THE CHILDREN ARE RESTLESS AND PERSUADE LUIS TO INCREASE THE WATER FLOW AND FILL THE POOL FASTER. IT FILLS AT A FASTER CONSTANT RATE THAN BEFORE. WHEN THE POOL IS COMPLETELY FULL, HE TURNS OFF THE HOSE AND THE CHILDREN ARE CAREFUL NOT TO SPLASH WATER OUT OF THE POOL. AFTER THE CHILDREN GET OUT OF THE POOL, LUIS EMPTIES IT. THE WATER POURS OUT RAPIDLY AT FIRST, THEN MORE SLOWLY AS THERE IS LESS AND LESS WATER LEFT. HE LEAVES A LITTLE WATER AT THE BOTTOM, WHICH WILL SLOWLY EVAPORATE.