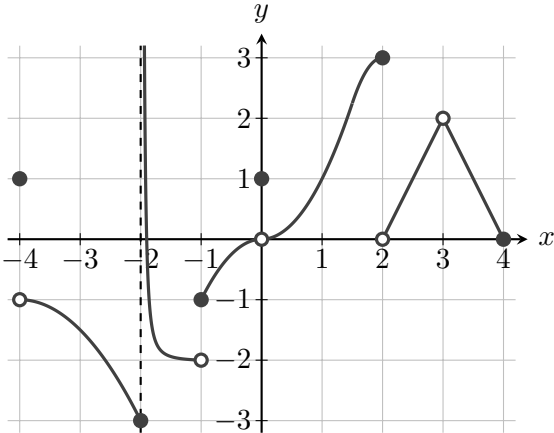## Activity 2

In class we've begun talking about limits of functions. This activity is intended to both give you some extra practice with limits and to hopefully expand on your understanding of them. Although you'll be working in groups, each person needs to turn in their own completed copy of the activity.

The Case of the Missing Ramen

Just before Huntr/x's latest live show, Rumi's special ramen went missing. As the key component of her pre-show carbo-load, she was understandably upset. Just then, Jinu burst into the room, slyly asking if anyone was missing some carbs. When Rumi slowly raises her hand, Jinu winks and says he knows what happened. However, all he's willing to give are a strange-looking graph along with a list of mathematical puzzles to sort through which will (allegedly) lead to a complete description of what happened.. To solve the mystery, you'll need to eliminate (one by one) each possible suspect, location, and explanation by finding the correct answers to the following clues. For example, if the clue indicates that "Zoey was relaxing in the bath house," you'd eliminate both Zoey and Bath house. After completing all 8 clues, only one choice in each column should remain, letting you write out the story of what happened to the ramen.

Suspects	Locations	Explanations of events
Mira	Bath house	Gave it to THE FANS
Zoey	Loft apartment	Threw it at a demon as a distraction
Jinu	Backstage	Misread the label and ate it by mistake
Abby	Han Clinic	Used coffee instead of water to cook it
Bobby	Couch! Couch! Couch!	Dropped it while skydiving

The entire graph of $y = f(x)$:

What happened to Rumi's ramen?

Clue 1: Use the graph of $f(x)$ to find $\lim\limits_{x \to 3} f(x)$.

2	No demon would be distracted by flying ramen.
3	Everyone knows to use hot water, not hot coffee, to make ramen.
1	Mira (finally) got to relax on the couch.
Does not exist	Bobby was pacing backstage (as usual).

Clue 2: Use the graph of $f(x)$ to find $\lim\limits_{x \to 2} f(x)$.

1.5	Everyone knows to use hot water, not hot coffee, to make ramen.
Does not exist	Mira was warming up backstage.
0	Bobby was looking for the girls at their apartment.
3	The ramen is clearly labeled as Rumi's so that nobody else would eat it.

Clue 3: Use the graph of $f(x)$ to find $\lim\limits_{x \to -1^+} f(x)$.

-2	Zoey was hanging out in their apartment.
Does not exist	Everyone knows better than to throw hot ramen onto their fans.
-1	Jinu was hiding behind the couch in order to surprise the girls.
0	No demon would be distracted by flying ramen.

Clue 4: Use the graph of $f(x)$ to find $\lim\limits_{x \to -1^-} f(x)$.

-2	Rumi is always careful to leave her ramen on the plane when skydiving.
Does not exist	No demon would be distracted by flying ramen.
-1	Zoey was warming up backstage.
0	Mira was hanging out in their apartment.

Clue 5: Use the graph of $f(x)$ to find $\lim\limits_{x \to -1} f(x)$.

-2	Bobby was taking a well-deserved break at the bath house.
Does not exist	Everyone knows to use hot water, not hot coffee, to make ramen.
-1	Jinu actually bumped into Rumi at the Han clinic.
0	The ramen is clearly labeled as Rumi's so that nobody else would eat it.

Clue 6: Use the graph of $f(x)$ to find $\lim\limits_{x \to 0} f(x)$.

0	Abby was doing situps in the bath house.
1	Jinu actually bumped into Rumi at the Han clinic.
-1	Everyone knows better than to throw hot ramen onto their fans.
Does not exist	The ramen is clearly labeled as Rumi's so that nobody else would eat it.

Clue 7: Use the graph of $f(x)$ to find $f(0)$.

0	Abby was doing situps in the bath house.
1	Everyone knows better than to throw hot ramen onto their fans.
-1	Bobby was arguing with the girls, who were on the couch.
Does not exist	Rumi is always careful to leave her ramen on the plane when skydiving.

Clue 8: Which of the following statements is true about the function f?

    (Note: the statement $\neq 0$ should be interpreted as "is a number not equal to 0.")

$\lim\limits_{x \to 4^-} f(x) = 0$	Zoey was getting some more tonics at the Han clinic.
$\lim\limits_{x \to 4^-} f(x) \neq 0$	Everyone knows to use hot water, not hot coffee, to make ramen.
$\lim\limits_{x \to 4^+} f(x) = 0$	Rumi is always careful to leave her ramen on the plane when skydiving.
$\lim\limits_{x \to 4^+} f(x) \neq 0$	Bobby was looking for the girls in their apartment.