

Piecewise Stories and Graphs

1) Time and a Half

You have a summer job at Panera that pays time and a half for overtime. That is, if you work more than 40 hours, your hourly wage for *extra* hours is 1.5 times your normal hourly wage of \$7.50.

- What equation could you use to express your pay, $P(h)$, as a function of hours worked, h , provided you did *not* work any overtime?
- What would the possible values of h be if you worked no overtime?
- What equation could you use to express your pay, $P(h)$, as a function of hours worked, h , provided you *did* work overtime? (*This equation is a little more in depth...think about how much you know you will already be getting paid for your regular hours, your rate for overtime, and how you would figure out how many hours of overtime you worked.*)
- What would the possible values of h be if you worked overtime?
- Use your answers from *a* through *d* to write a piecewise function that gives your weekly pay, $P(h)$, in terms of the number of hours worked, h .
- How much will you get paid if you work 22 hours? 45 hours?

2) Take a Hike!

On Saturday, you and your buddies took a hike up the mountains. You started at the foot of the mountains at 8am. From 8am to 10am, you climbed a total of 2000 feet at a steady pace. From 10am to 12pm, you climbed only 1000 feet. At 12pm, you stopped for lunch and rested for an hour. After lunch, you climbed another 3000 feet at a steady pace until you reached the peak at 2pm.



- Create a graph that shows $h(t)$, the function that models your height over time. Let t be the number of hours that have passed since you started climbing.
- Label the turning points in your graph with their $(t, h(t))$ coordinates.
- For the graph that you have created in part *a*, write the equation for this piecewise function. (*You may want to use the points you labeled to help you find the equations.*)
- What would the value of $h(1)$ be? What does this mean in context of your hike?
- When did $h(t) = 1500$? What does this mean in context of your hike?

3) Going to the Groomer

Your favorite groomer at Barking Beauty charges according to your dog's weight. If your dog is 15 pounds and under, the groomer charges \$35. If your dog is between 15 and 40 pounds, she charges \$40. If your dog is over 40 pounds, she charges \$40, plus an \$2 for each additional pound.

- Write a piecewise function, $P(w)$, to describe what Barking Beauty charges.
- What do w and $P(w)$ represent in context of the problem?
- Graph $P(w)$. Label any important $(w, P(w))$ points.
- What is the value of $P(60)$?
- What customer question would you be answering in part *d*?



Summarize the Math

- a. What similarities and differences did you notice in your piecewise functions? Graphs?
- b. What information was important to collect from the problem in order to develop your piecewise functions?

Check Your Understanding

T-Shirt Sales

You plan to sell ECHS t-shirts as a fundraiser. The wholesale t-shirt company charges you \$10 a shirt for the first 75 shirts. If you purchase up to 150 shirts, the company will lower its price to \$7.50 per shirt after 75. After you purchase 150 shirts, the price will decrease to \$5 per shirt.

- a. Write a piecewise function that models the cost.
- b. You want to ask the PTSO for help in purchasing the shirts. Create a graph of the costs to help them visualize the cost.
- c. Evaluate the cost if you club sells 70 shirts, 100 shirts, and 200 shirts.