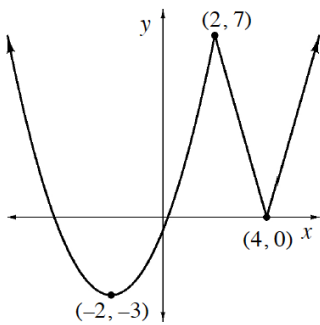


Homework #17

First & Last Name: _____ **Class:** _____

For homework to be graded, it must be *fully completed*. This means you must **show your work**.

- Oil is leaking out of a car at a rate of $y = 0.2^t$ liters/hour for $0 \leq t \leq T$.
 - Sketch a graph of this situation. Label the units on the axes.
 - Shade the area under the curve for $0 \leq t \leq 1$. What does the shaded area represent? What are the units?
 - Use two left endpoint rectangles to approximate the amount of oil that has accumulated during the first hour.
- Write the equation of the line that passes through the point $(3, -2)$ with a slope of 7. Write your answer in *point-slope* form.
- Revisit your rates of change from Homework #11-6. Decide what measurement will be determined if the areas under graphs of these rates are calculated.
- [Challenge]** Use a quadratic function and an absolute value function to write a piecewise-defined function that will produce the graph shown below.



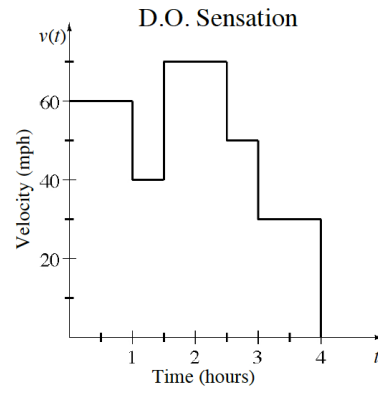
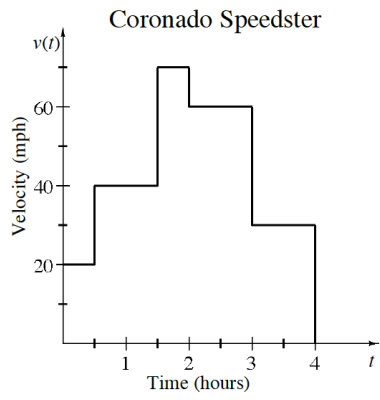
- Write a complete set of approach statements for

$$y = \frac{(2x + 1)(2 - x)}{2x + 1}$$

- A flag is defined by the region between the x -axis and the function listed below. Sketch the flag and calculate the volume of the solid generated by rotating the bounded region about the x -axis. To help you visualize this, use [Desmos](https://www.desmos.com/calculator/9ehccodx2e) ([desmos.com/calculator/9ehccodx2e](https://www.desmos.com/calculator/9ehccodx2e)).

$$f(x) = \begin{cases} 2 & \text{for } 0 \leq x \leq 2 \\ 4 - x & \text{for } 2 < x \leq 4 \end{cases}$$

- [Challenge]** If $f(x) = \frac{x^2 - 2x - 3}{x - 3}$ and $g(x) = -x + 2$, write an equation for $h(x) = f(g(x))$.
 - Graph $y = h(x)$ and write its domain in set notation.
 - Write an equation the end-behavior function of h .
- Sarah wants to buy a new car and is deciding between two models. She has convinced both car dealerships to allow her to test drive each car for 4 hours as long as she returns with a full tank of gas. In order to test the performance of both vehicles, she kept track of her velocity during her test drive every half hour. The results of her test drives are shown below.



Sarah finds that both cars performed exceptionally well and she will be very happy with either one. She decides to make her final decision based on the gas mileage of each model. Her test drive of the Coronado Speedster used 7.955 gallons of gas and her test drive of the D.O. Sensation used 8.542 gallons. Which car should she choose?