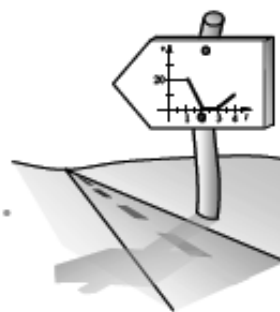


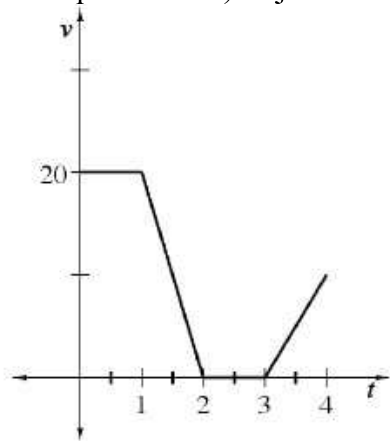
1.4.3 How do I find average velocity on a velocity graph?

Average Velocity on a Velocity Graph



1-162. DIJIN'S TRAVELS

Dijin is late to his calculus class again! However, he is in no hurry. Below is a graph of the *velocity* (in meters per minute) Dijin travels during the first 4 minutes of his journey.



- Estimate Dijin's velocity at $t = 3.5$ minutes.
- If his velocity is measured in meters per minute, while the time is measured in minutes, what are the appropriate units for the area under the curve? Why?
- What does the area under a velocity curve represent?
- How far did Dijin travel during the first 4 minutes?
- What was Dijin's average velocity during the first 4 minutes?
- Sketch Dijin's graph on your paper. On the same set of axes, sketch the line $y = \text{avg velocity}$ (from part (e)) and shade the area under the curve. What shape is this?
- How many times did Dijin travel at his average velocity? Justify your answer.



- h. If Dijin's initial position was 100 meters away from the classroom and he continues to travel at the same rate he was traveling at $t = 4$, sketch a graph of his velocity. How many minutes would it take him to get to class?

1-163. Due to eye-fatigue, a person's reading rate decreases after 2 hours. The rate (in words per hour) of a certain reader is represented by the piecewise function below.

$$\text{reading rate} = \begin{cases} 6000 & \text{for } 0 \leq t \leq 2 \text{ hrs} \\ 7000 - 500t & \text{for } t > 2 \text{ hrs} \end{cases}$$

- Sketch a graph of this reading rate model.
- According to this model, how many words can this person read in 5 hours? How did you find your answer?
- What is the average number of words per hour a person reads over this five-hour interval?



1-164. Summarize your method for finding how much something has changed given its rate of change. For example, given a rate such as how fast a person types, how would you be able to find the number of words typed? Explain why your method works.

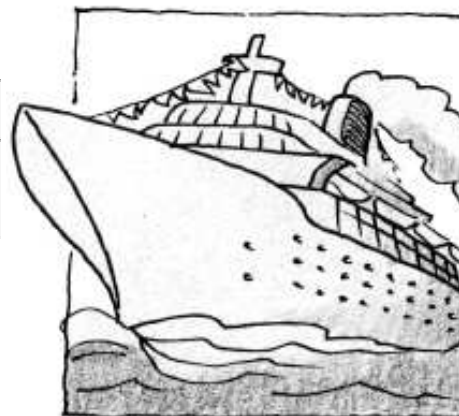
1-165. TRIP TO BAJA

Ms. D went on an awesome cruise to Baja, California this summer. One morning, at 8:00 a.m., she was informed that the cruise ship was traveling at a rate of 39 miles per hour.

She created the table below and recorded the speed of the ship at 15-minute intervals.

- Draw a speed-time graph and estimate the distance traveled between 8 a.m. and 10 a.m. Make your estimate as accurate as possible.

Time (hrs)	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45
Speed (mph)	39	34	26	23	15	18	26	27



- If a Europe-bound cruise left from Catalina Island, which is 22 miles from Los Angeles Harbor, approximately how far from LA was the ship at 10 a.m.?

1-166. Theo left his motion graph at home. Fortunately, while he had the graph, he determined the properties shown below. Help him re-create a possible distance-time graph of his motion.

DETAILS:

- Theo walked in one direction during the entire experiment.

- His average velocity during the first half of the time was 5 feet per second. His average velocity for the second half was only 3 feet per second.
- He started while standing 2 feet from the motion detector and began to walk away from it at $t = 0$. He stopped when he was 26 feet from the motion detector.



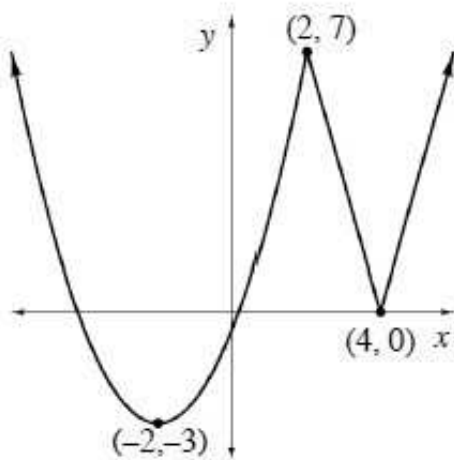
1-167. Oil is leaking out of a car at a rate of $y = 0.2^t$ liters/hour for $0 \leq x \leq t$. [Homework Help](#)

- 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?

1-168. Find the equation of the line through the point $(3, -2)$ with a slope of 7. Leave your answer in point-slope form. [Homework Help](#)

1-169. Revisit your rates of change from problem 1-143. Decide what measurement would be determined if the area under graphs of these rates were calculated. [Homework Help](#)


1-170. Use a parabola and absolute value function to find a piecewise defined function that will produce the graph shown below: [Homework Help](#)



1-171. Write a complete set of approach statements for $y = \frac{(2x+1)(2-x)}{2x+1}$. [Homework Help](#)

1-172. A flag is defined by the region between the x -axis and the function listed below. Sketch the flag and find the volume when the flag is rotated about the x -axis. [Homework Help](#)

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

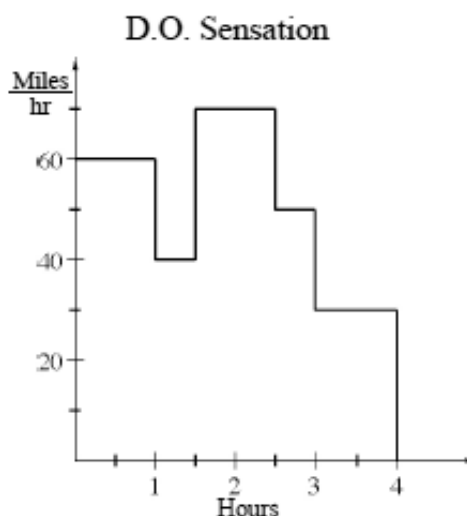
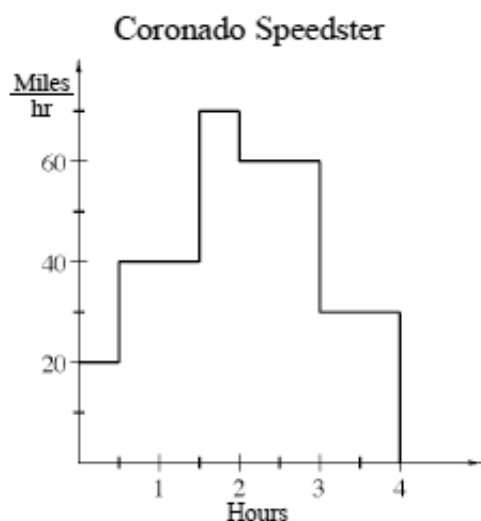
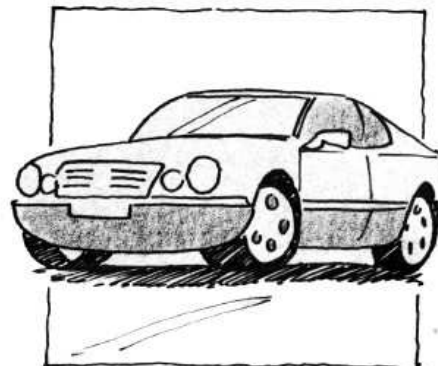
1-173. For $f(x) = \frac{x^2 - 2x - 3}{x - 3}$ and $g(x) = -x + 2$, find and simplify $h(x) = f(g(x))$ [Homework Help](#) 


a. Graph $h(x)$ and write its domain in set notation.

b. Find $b(x)$, the end behavior function of $h(x)$.

1-174. TEST DRIVE

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 would be very happy with either one. She decided 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? [Homework Help](#) 

1-175. A focus of this course will be determining maximum and minimum values for a function on a given interval. However, you already have the skills to do this for certain functions. On your paper, sketch $y = 2 \sin(3x)$ for $0 \leq x \leq \frac{2\pi}{3}$. Find the points at which y is a maximum and minimum.

[Homework Help](#) 