

Instructions: Your homework is in two parts, which you should turn in separately. Except for the division into parts A and B, this is identical to the week 2 homework in the course packet.

Due Wednesday, October 11, in lecture.

Week 2 Homework Problems, part A

- 1 Stewart, section 5.3: #3, 9, 15, 17, 21, 25, 47, 49, 54, 59, 68
- 2 Stewart, section 5.4: #3, 9, 13, 29, 31, 32, 43, 45, 53, 56, 59
- 3 Stewart, section 5.5: #5, 11, 17, 23, 37, 38, 51, 57, 63, 73, 78, 79

Week 1 Homework Problems, part B

4 The acceleration due to gravity on Earth is 32 ft/sec². A tomato is dropped from 100 feet above the ground.

- a) At what speed does the tomato hit the ground?
- b) How long does it take to travel the last 10 feet?

5 The graph of a function f (Figure 1) consists of a line segment, a circle, and then two more line segments. Let g be the function given by $g(x) = \int_0^x f(t) dt$.

- a) $g(2) = \underline{\hspace{2cm}}$ $g(4) = \underline{\hspace{2cm}}$ $g(5) = \underline{\hspace{2cm}}$
 $g(6) = \underline{\hspace{2cm}}$ $g(6.1) = \underline{\hspace{2cm}}$
- b) $f'(6) = \underline{\hspace{2cm}}$ $g'(6) = \underline{\hspace{2cm}}$
- c) $f'(3) = \underline{\hspace{2cm}}$ $g'(3) = \underline{\hspace{2cm}}$
- d) Find all values of x on the interval $(0, 6)$ at which g has a relative maximum. It may help to sketch a graph of $g(x)$.
- e) Find all values of x on the interval $(0, 6)$ at which g has a relative minimum.

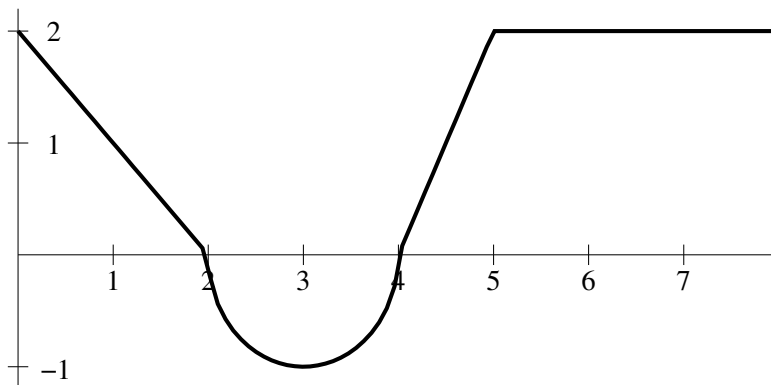


Figure 1: $f(x)$

6 Suppose you look out the window of a skyscraper and see someone throw a tomato downward. Your window is at a height of 450 ft. The tomato passes your window after 2 seconds and hits the ground after 5 seconds (from the time it was thrown). Find the velocity at which the tomato was thrown down, and also the height from which it was thrown. (Neglect air resistance).

7 Same as problem 6, except that you did not see the moment when the tomato was dropped. However, in this problem you know that it fell from rest (ie: $v_0 = 0$) and this time you measure exactly 2 seconds between the time the tomato passes your window (still at a height of 450 feet) and the time it hits the ground. From what height did it fall?

8 At time $t = 0$ seconds, an object is tossed straight up. The upward velocity of the object is shown in Figure 2. Use the information provided to answer the following questions.

- a) What was the initial upward velocity of the object (include units)? _____
- b) At $t = 2$ seconds, the object is _____ feet _____ (above or below) its starting point.
- c) At $t = 4$ seconds, the object is _____ feet _____ (above or below) its starting point.
- d) How far did the object travel during its first 7 seconds?
- e) How far from its starting location is the object after 7 seconds?
- f) Sketch a graph of $h(t)$, the elevation of the object at time t .
- g) What kind of object (and situation) might lead to this velocity graph?

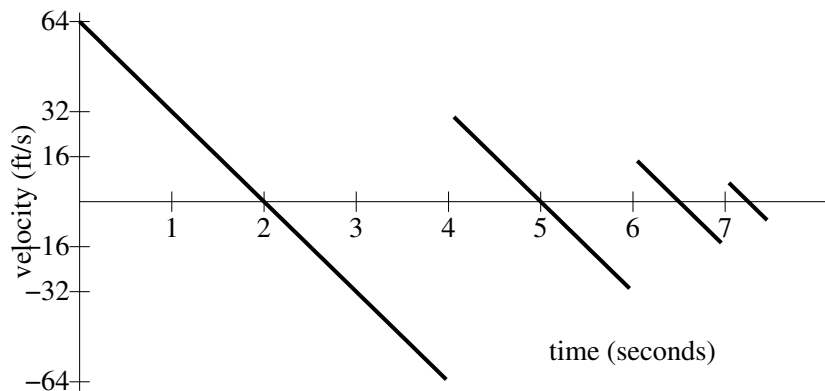


Figure 2: velocity graph of the object