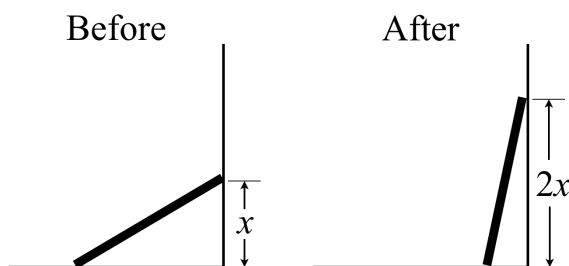


## Constant Rates of Change

1. What is the constant rate of change between the amount of water in a cylindrical cup of any size and the height of the water in the cup?
2. Every morning Sally bikes 5.4 miles to the OSU campus at a constant speed. Let  $f(t)$  represent the distance (in miles) from home Sally has ridden on a particular morning and let  $t$  represent the number of minutes elapsed since Sally left home. Write a description of each calculation in this context.
  - (a)  $f(23) - f(12) =$
  - (b)  $\frac{f(17) - f(5)}{12} =$
  - (c) The solution  $t^*$  to the equation  $f(t^*) = 3.5$
3. A cylindrical cup with radius 1.5 inches is filling with water at a constant rate of 2 cubic inches per second. At what constant rate is the water level rising?
4. Suppose a wooden board is leaning against a wall. Now suppose that the slant of the board is adjusted so that it reaches twice as high on the wall (see the image below).



The slope of the board is:

- a. More than twice what it was before
- b. Exactly twice what it was before
- c. Less than twice what it was before
- d. The same as what it was before
- e. There is not enough information to answer this question

5. Mara is traveling down Interstate 35 at a constant velocity. For every increase of ten minutes in the number of minutes  $x$  since she passed mile marker 174, her distance  $y$  from Downtown Oklahoma City decreases by seven miles. Which of the following statements is definitely true?

- a.  $\Delta y = -0.7\Delta x$
- b.  $y = -0.7x$
- c.  $x \approx -1.43y$
- d. Statements (a) and (b) are definitely true
- e. Statements (a), (b), and (c) are definitely true

6. A candle has been burning at a constant rate of 1.25 inches per hour. The candle has been burning for 4 hours and is 5.5 inches tall. What was the length of the candle before it was lit?

- a. 5 inches
- b. 5.5 inches
- c. 6.75 inches
- d. 10.5 inches
- e. 0.5 inches