

Homework 1

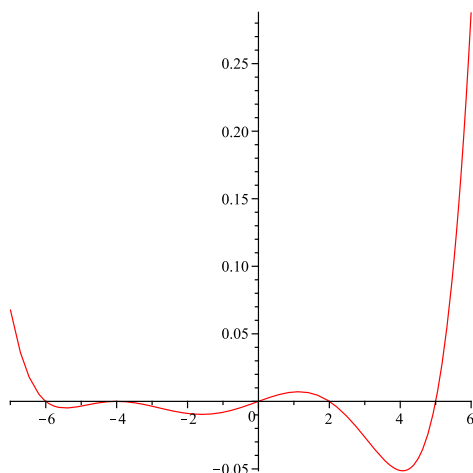
Sections 2.1 - 2.4
Due: Wednesday, June 8

See syllabus for all homework directions (points will be taken off if not followed). All work must be shown, no work means no credit!

1. The following table gives the position of a particle moving along the x -axis as a function of time, t , in seconds, where x is in centimeters. What is the average velocity of the particle from $t = 2$ to $t = 6$?

t	0	2	4	6	8
$x(t)$	0	14	-6	-18	-4

2. A particle moves at **varying velocity** along a line and $s = f(t)$ represents the particle's distance from a point as a function of time, t . Sketch a possible graph for f if the average velocity of the particle between $t = 2$ and $t = 6$ is the same as the instantaneous velocity at $t = 5$.
3. Use the definition of the derivative to find $f'(x)$ where $f(x) = \frac{1}{x+2}$.
4. If the following function shows $f(x)$, draw $f'(x)$. (Note, for your graph I do not care about the y -axis labels, but you must have the x -axis labeled.)



5. If t is the number of years since 2011, the population, P , of China, in billions, can be approximated by the function

$$P = f(t) = 1.34(1.004)^t.$$

- (a) Evaluate $f(9)$. Explain what this means in the context of the problem.
 - (b) Use at least 3 values of h and approximate $f'(9)$. (Note, we have not covered how to find $f'(t)$ directly yet, but we can approximate.) Explain what this means in the context of the problem.
6. The distance in feet of a particle from a fixed position at time t seconds is given by $s(t)$. If $s(5) = 10$ and $v(5) = -2$ write the equation of the tangent line to $s(t)$ at $t = 5$.