MA 231 In-class Homework on 2.1-2.2 Name: Key

- The average rate of change of $f(x)$ with respect to x on the interval from $x=a$ to $x=b$ is

  average rate of change = $\dfrac{f(b)-f(a)}{b-a}$

  It is the slope of the secant line through $(a,f(a))$ and $(b,f(b))$.

- The instantaneous rate of change of $f(x)$ with respect to x at $x=a$ is the derivative

  $$f'(a)=\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}$$

  It is the slope of the (tangent line to the) curve $y=f(x)$ at $x=a$.

1. The graph of $y=f(x)$ is given below. Without doing any computations, list the following parts in order from smallest to largest by putting the numbers 1-7 next to each part.

7 a) The instantaneous rate of change of $f(x)$ at $x=-1$.
5 b) The instantaneous rate of change of $f(x)$ at $x=4$.
1 c) The instantaneous rate of change of $f(x)$ at $x=6$.
3 d) The instantaneous rate of change of $f(x)$ at $x=8$.
6 e) The average rate of change of $f(x)$ on the interval from $x=-1$ to $x=4$.
2 f) The average rate of change of $f(x)$ on the interval from $x=6$ to $x=8$.
4 g) The average rate of change of $f(x)$ on the interval from $x=-1$ to $x=8$.

2. The graph of $y=f(x)$ is given below.

   a) Compute the average rate of change of $f(x)$ on the interval from $x=1$ to $x=5$.

   average rate of change $=\dfrac{\Delta f(x)}{\Delta x}=\dfrac{f(b)-f(a)}{b-a}=\dfrac{f(5)-f(1)}{5-1}=\dfrac{7-5}{4}=\dfrac{1}{2}$

   b) Compute the average rate of change of $f(x)$ on the interval from $x=1$ to $x=2$.

   average rate of change $=\dfrac{\Delta f(x)}{\Delta x}=\dfrac{f(2)-f(1)}{2-1}=\dfrac{6-5}{1}=1$

   c) Is part (a) or (b) a better approximation $f'(1)$, to the instantaneous rate of change of $f(x)$ at $x=1$?

   ~~d) If you have time, find $f'(1)$ on the back of this paper.~~ ← cannot do this w/o function formula $f(x)=$ - - - -